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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD (FOURTH ECHELON) AND DEPOT MAINTENANCE MANUAL

TEST SET, RADIO AN/VRM-l

This copy is a reprint which includes pen and ink Changes in force at the time of publication.

HEADQUARTERS, DEPARTMENT OF THE ARMY
3 JULY 1962

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C 6

Change
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 12 *March 1980*

General Support and Depot Maintenance Manual Including Repair Parts and Special Tools Lists TEST SETS, RADIO AN/VRM-1 AND AN/VRM-1A (NSN 6625-00-892-5542)

TM 11-6625-496-45, 3 July 1962, is changed as follows:

The title of the manual is changed to read as shown above.

Page 2. paragraph 1, subparagraph c is superseded as follows:

c. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and fowarded direct to Commander, US Army (communications and Electronics Material Readiness Command, ATTN: DRSEL-ME-MQ. Fort Monmouth, NJ 07703.

Paragraph ld, subparagraph (5) is added after subparagraph (4). Add the following subparagraphs:

(5) The TS-1777A/VRC displayed a problem of long warmup voltage data drift. When the CO/NO-CO test voltage levels are set at the time the set is first turned on, it seeks a new set of test trigger voltage levels after approximately 30 minutes. This condition has been alleviated by the fol1owing changes, The changes have been incorporated in the TS-1777A/VRC starting with serial number 602 and higher under Contract No. DAAB05-73-C-1632 (1973) and succeeding contracts.

(a) The thermal resistance of diode CR7902 and resistor R7901 (figs. 14 and 54) is reduced by the application of a silicon heat sink compound (Dow Corning No. 340) between the mating surfaces.

(b) Diode CR7901 (figs. 14 and 54), type 1N645, is rated at 400 milliamperes (ma) maximum current. Actual current measurements arc in excess of 400 ma when tested at 28.6 volts dc. Therefore, CR7901 is now type 1N4383 (NSN 5961-00-765-6578) which is a l-ampere device. This will result in a reduced statbilization period.

(c) Resistor R790S (figs. 17 and 55) has been changed from 475 ohms (fig. 39.1) to 402 ohms (NSN 5805-00-818-5548) (fig 39.2) This allows the midpoint trigger leve1 for selector switch positions 9 and 14 to be set closer to the median value for triggering. This action provides a more optimized operating point. Switch position 14 must be set near the lower limit to maintain switch position 9 value below the operating limit.

(d) The TS-1777A/VRC exhibited problems in sensitivity caused by lack of adjustment capabilities for positions 2 and 19 of the selector switch. Fixed resistors R7902 (position 2) and R7919 (position 19) (fig. 11). respectively. have been replaced with variable resistor R7902 in series with fixed-film resistor R7923 and variable resistor R7919 in series with fixed-film resistor R7922 (fig. 11.1). Resistors R7922 and R7923 prevent overheating of transistors Q7802, Q7803, and associated components if the variable resistors arc set for minimum resistance. The minimum resistance setting of R7902 and R7919 results in the full input signal level of 20 volts applied to the base of Q7802, which is in the full input signal level of 20 volts applied to the base of Q7802, which is in excess of the normal trigger voltage of 2.6 volts. The resul -

tant high current through the base-to-emitter of Q7802 and R7811 (15 ohms) to ground would cause both Q7803 and R7811 to fail.

Page 8, paragraph 9a: First sentence, delete *'R7902° and replace it with R7802.

Page 9, paragraph 10c: Third sentence, line 8; delete "base" and replace it with collector.

Page 9, paragraph 10d: In line two, delete "DS7902 and DS7901" and replace it with DS7901 and DS7902.

Page 11, paragraph 12b: In line 4; change "R7817" to R7921 .

Page 11, paragraph 12c: In line 2, change " +22 volts dc" to between 21.0 and 22.0 volts dc.

Page 11, paragraph 12d: At the end of paragraph 12d, place the following:

Note

In the AN/VRM-1A models that contain TS-1777A/VRC with serial numbers 802 and higher, inductor L7302 has been replaced with resistor R7304.

Page 12, paragraph 14. Add the following sentence after the second sentence:
In some equipment (para 1d(5)(d)), the test voltage is connected through rf choke L7301 and across voltage divider network consisting of variable resistor R7902 and resistors R7923 and R7917 (fig. 9.1).

Paragraph 15, line 5. "C7503" is changed to read C7501.

Page 13. Figure 9 is superseded by a new figure 9.

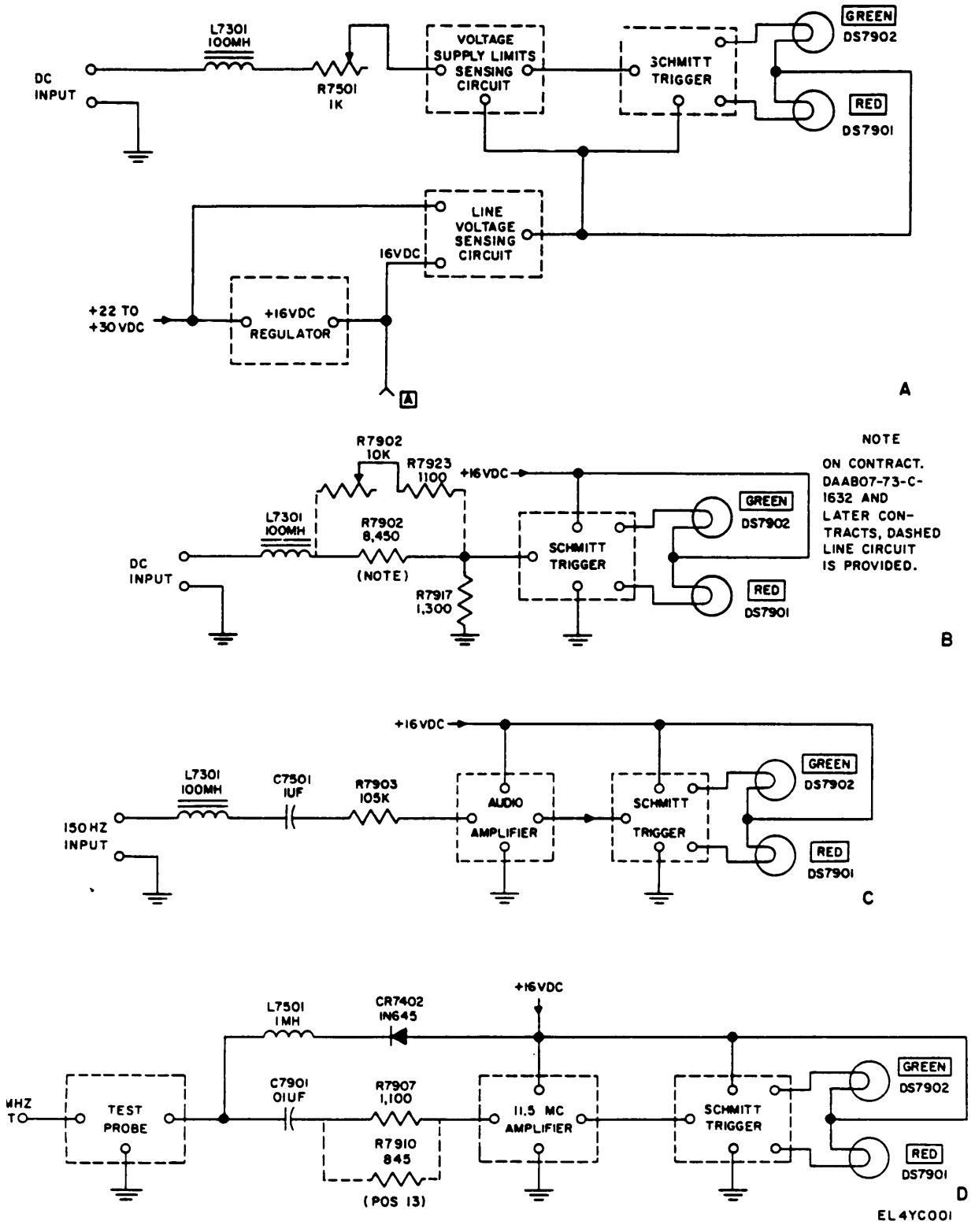


Figure 9. Tests in *selector switch positions A. 2..3, and 7. simplified schematic diagram.*

Page 14, paragraph 19: In last line, change "475" to 402.

Paragraph 22: In line 5, add "R7918" after C7901.

Paragraph 23, line 5. "R7901" is changed to read R7910.

Page 16, paragraph 27.1. The following sentence is added after the second sentence:

In some equipment (para 1d(5)(d)), the tested voltage is connected through rf choke L7301 and across voltage divider network consisting of variable resistor R7919 and resistors R7922 and R7920.

Figure 10.1 is superseded by new figure 10.1.

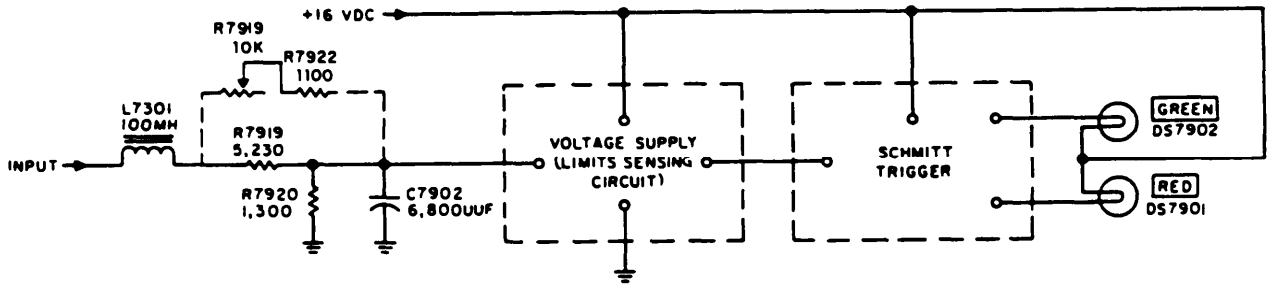


Figure 10.1. Test in selector switch position 19. simplified schematic diagram.

Page 29, paragraph 33d. Troulbleshooting Chart. Make the following changes for symptom 2; insert the material before the first probable trouble and correction ("Diode CR7902, etc."). In *Probable trouble column, insert: Knob on selector* switch S7901 is set 180 degrees from proper position.

In *Correction* column, insert: Set *S7901* to position 11. If GREEN Indicator lights. remove the switch knob and install it with the arrow pointing to position A. If GREEN indicator does not light, replace the lamp.

Page 20, paragraph 33d, Troubleshooting Chart, Make the following changes for symptom 4; insert the material before the first probable trouble and correction ("Defective R7902, etc."). In *Probable trouble* column, insert: In equipment provided with potentiometer R7902 (fig. 11.1. para *ld(5)(d)).* the potentiometer is out of adjustment.

In *Correction* column, insert: Adjust potentiometer R7902 (para 43d.1).

Page 21. paragraph 33d, Troubleshooting Chart. Add the following material after symptom 13.

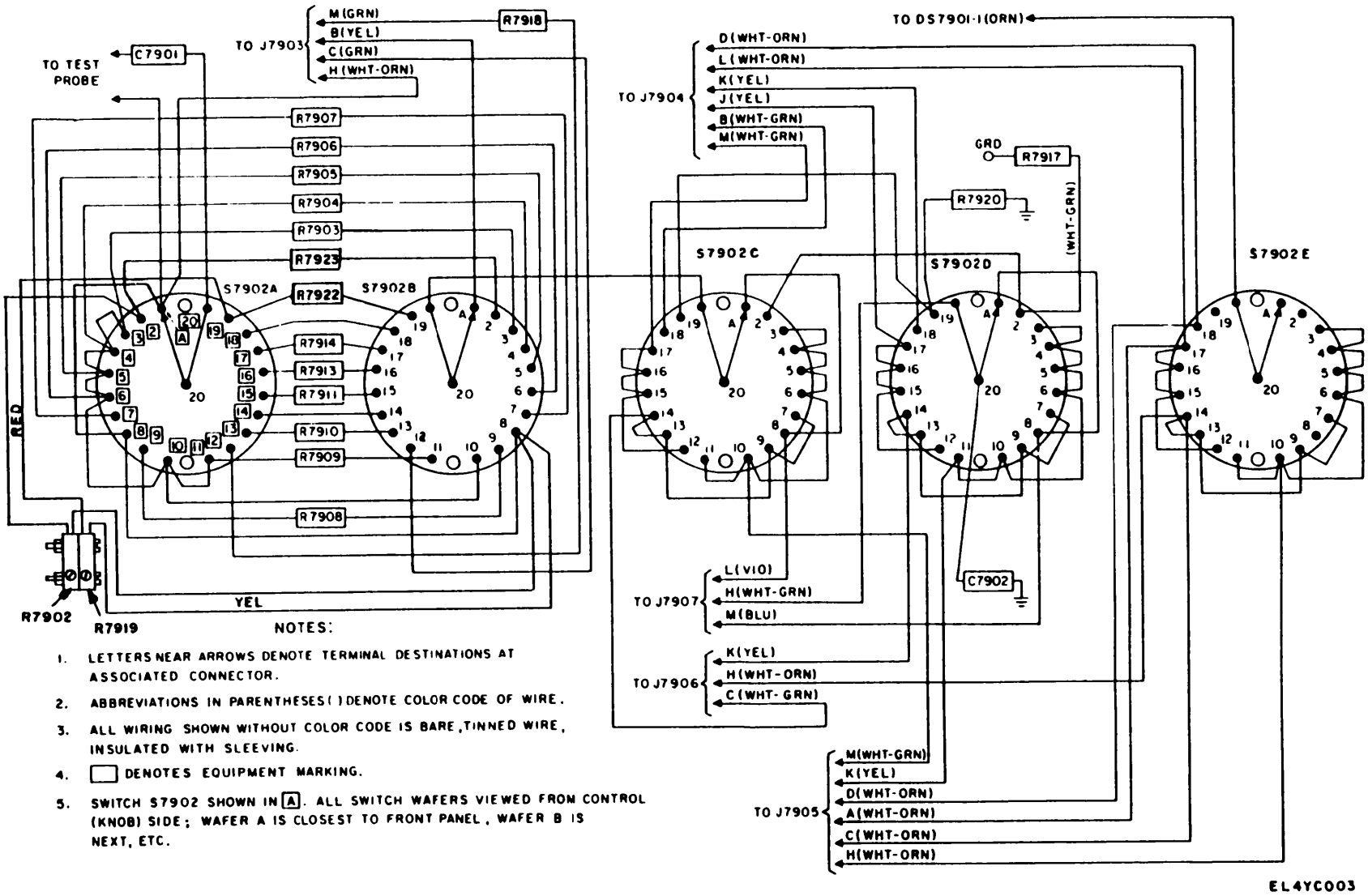
Symptom	Probable trouble	Correction
14. AN/VRM-1 operates *normally* in all positions except position 19	Defective fixed resistor R7919 or, in equipment provided with potentiometer R7919 (fig. 11.1, para 1*d*(5)(*d*)), the potentiometer is out of adjustment.	With S7902 in position 19, check resistance of R7919. Adjust potentiometer R7919 (para 43*d*.1).

Page 22, paragraph 34b. Add the following to the chart:

Contact No. S7902A and S7902B	Resistor	Value (ohms)
2	R7902 and R7923	8,500"
19'	X7919	5,230
19'	R7919 and R7922	5,300"

Two resistors provided in certain equipment; see paragrah 1d(5)(d).
""Value measured will depend on position of potentiometers R7902 and R7919.

Page 23. New figure 11.2 is added after figure 11.1.



NOTES:

1. LETTERS NEAR ARROWS DENOTE TERMINAL DESTINATIONS AT ASSOCIATED CONNECTOR.
2. ABBREVIATIONS IN PARENTHESES ( ) DENOTE COLOR CODE OF WIRE.
3. ALL WIRING SHOWN WITHOUT COLOR CODE IS BARE, TINNED WIRE, INSULATED WITH SLEEVING.
4. [ ] DENOTES EQUIPMENT MARKING.
5. SWITCH S7902 SHOWN IN [A]. ALL SWITCH WAFERS VIEWED FROM CONTROL (KNOB) SIDE; WAFER A IS CLOSEST TO FRONT PANEL, WAFER B IS NEXT, ETC.

Figure 11.2. Selector switch S7901, wiring diagram; applicable to equipment with potentiometers R7902 and R7919; TS-1777A/VRC.

Page 27, paragraph 38. Make the following changes:

Subparagraph *p.* The following note is added:

NOTE

If diode CR7901 is type 1N645 (NSN 5961-00-577-6084), replace it with type 1N4383 (NSN 5961-00-756-6578) (72699); para 1d(5) *(b)).*

Subparagraph r. The following is added before subparagraph (1): Before inserting diode CR7902 in its mounting hole, apply a thin evenly spread coating of Dow Corning No. 340 silicon sealing (heat sink) compound (NSN 8030-00-998-3337) on the surface of the diode and the mounting hole. After securing ((1) below), wipe away excess compound. See paragraph 1d(5)(a) for details.

Subparagraph t. Add the following before subparagraph (1): Before replacing resistor R7901 in position, apply a thin coating, evenly spread, of Dow Corning No. 340 silicon heat sink compound on the surface of the resistor and the mounting surface. After securing ((1) below), wipe away excess compound. See paragraph *1d(5)(a)* for details.

Page 28, paragraph 38u. After paragraph 38v. add the following note.

NOTE

In some equipment (para 1d(5)(d)), there are 30 leads instead of 26 connected to switch S7902.

Page 29, paragraph 38x. The following subparagraphs are added after subparagraph (2):

(3) Measure the resistance of resistor R7908; if its resistance is 475 ohms, remove it and install a 402-ohm resistor (NSN 5905-00-818-5548) (para id(s)(c)).

(4) On some equipment (para 1d(5)(c)), fixed resistors R7922 and R7923 are connected, respectively, to potentiometers R7902 and R7919 (fig. 39.2) for positions 2 and 19, respectively, of the switch.

Figure 15 is superseded by a new figure 15:

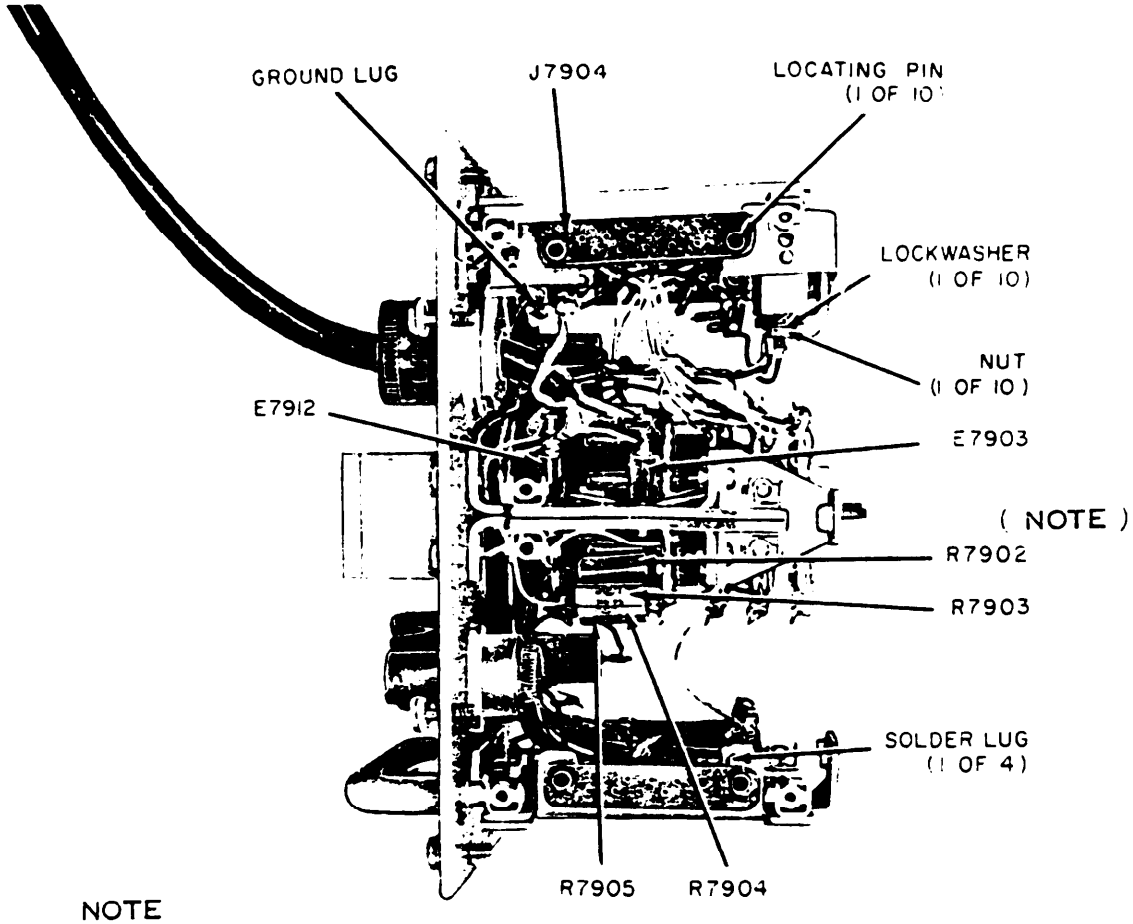


Figure 15. Test Set, Radio TS-1777/VRM-1 and TS-1777A/VRM-1 *front panel chassis, top view.*

Page 35, paragraph 43. The following is added after subparagraph d:

d.1. DC Circuits (Positions 2 *and 19).* The following procedures are performed on those equipments with potentiometer R7902 on position 2 of switch R7910 and potentiometer R7919 on position 19 of the switch (fig. 15 and 39.2).

(1) Reduce the 721A output to 0 volt dc. Use the TS-443/U to measure the 721A output.

(2) Turn the TS-1777A/VRM-1 selector to position 2.

(3) Set potentiometer R7902 (fig. 11.2 and 15) approximately midrange.

(4) Raise the 721A output until the GREEN indicator lights. The output of the 721A should be between 19.00 and 21.10 volts dc.

(5) If necessary, adjust potentiometer R7902 to assure the condition in (4) above.

(6) Reduce the 721A output to 0 volt dc.

(7) Turn the TS-1777A/VRM-1 selector switch to position 19.

(8) Set potentiometer R7919 (fig. 11.2 and 15) approximately midrange.

(9) Raise the 721A output until the GREEN indicator lights. The output of the 721A should be between 13.00 and 14.70 volts dc.

(10) If necessary, adjust potentiometer R7919 to assure the condition in (9) above.

Make the following changes as idicated:

Page	Paragraph	Change	To
59	*57b(5)*	+4.0 volts	+ 3.5 volts
	57b(6)	+ 5.5 volts	+ 5.0 volts
	57C(3)	10.500 mc	10.75 mc ±40 cps
		+ 1.0 volt dc ±0.30	3.00 volts dc ±0.05
	57C(4)	13.000 mc	10.10 mc ±40 cps
		+1.0 volt dc ±0.30	1.65 volts to 275 volts dc
	57c add new paragraph:		

(5) Adjust the 606A frequency to 11.60 mc ±40 cps while maintaining a 411A indication of 10 mv. A normal indication should be 1.65 to 2.75 volts dc.

	57c(5) and (6)	(5) and (6)	(6) and (7)
60	58b(1)	150 mv	100 mv
	58b(3)	+ 3.2 volts	+4.0 volts
	58b(4)	300 mv	200 mv
61	58f(1)	200 mv	120 mv
	58f(3)	+ 3.0 volts	+ 2.5 volts
	58f(4)	300 mv	200 mv
		+ 4.0 volts	+ 6.0 volts
	58g(1)	200 mv	120 mv
	58g(3)	42.00 mc	44 mc
		200 mv	120 mv
	58g(4)	54.00 mc	50.00 mc
		200 mv	120 mv
	58g(5)	+ 1.0 volt	+ 1.4 volts
	58g(6)	+ 1.0 volt	+ 1.4 volts
62	*59b(2)*	P7801-B	R7901 and R7921
	59c(5)	+ 20.7 volts	Between 10.00 and 21.10 volts
67	65g	21.80 volts	21.10 volts
	Add NOTE after 651:		

NOTE

For R7902 figure 11.2 adjust to occur at 20.0 volts 65l for R7119 fig. 11.2 adjust to occur at 13.75 volts.

67e	0.125 and 0.250 volt	0.110 and 0.265 volt
67h	0.200 and 0.250 volt	0.155 and 0.225 volt
67j	0.170 and 0.210 volt	0.155 and 0.225 volt
671	0.650 and 0.810 volt	0.645 and 0.815 volt
68d	0.230 and 0.330 volt	0.215 and 0.345 volt
68f	0.100 and 0.140 volt	0.085 and 0.155 volt
68h	0.180 and 0.250 volt	0.165 and 0.265 volt
68j	0.012 and 0.016 volt	0.0105 and d 0.0175 volt
69d	0.100 and 0.135 volt	0.085 and 0.150 volt

Page 75. Add figure 38.2 after figure 38.1.

Page 77. Add figure 39.2 after figure 39.1.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-51, Direct and General Support maintenance requirements for AN/VRM-l.

TM 11-6625-496~5
***C 5**

CHANGE
No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 4 June 1973

General Support and Depot Maintenance Manual Including Repair Parts and Special Tool List TEST SETS, RADIO AN/VRM-1 AND AN/VRM-1A

TM 11-6625-496-45, 3 July 1962, is changed as follows:

Page 2, paragraph 1, Delete subparagraph *b.*
Paragraph 1, Delete subparagraph c and substitute the following:

c. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Report should be made on DA Form 2028 (Recommended Changes to Publications) and forwarded to Commander, US Army Electronics Command, ATTN: AMSEL-MA-CR, Fort Monmouth, N.J. 07703

Paragraph 1.1.

Change the second sentence to read "DA Pam
— 310-4 is an index of current technical manuals, technical bulletins, supply manuals (types 7, 8, and 9), supply bulletins, and lubrication orders."

Page 4, figure 1. At Q7402 and Q7403, delete "2N270" and insert "2N270 (MOD) OR 2N599."

Page 6, figure *3.* To *"2N2208"* at Q7701, add 2N588 OR $2N1225_0$

Page 11 of C 4, figure 39.1. Make the following changes:

At C7602, add 220 UUF (NOTE 7).

At Q7602 and Q7701, add OR 2N1225 (NOTE 8).

At Q7402 and Q7403, delete "2N270" and insert the following: 2N270 (MOD) OR 2N599 (NOTE 8).

Add the following notes:

7. VALUE OF C7602 IS 220 UUF IN EQUIPMENT PROCURED ON CONTRACT DAAB0-5-72-C-4921.

8. Q7602 and Q7701 ARE TYPE 2N1225, AND Q7402 AND Q7403 ARE TYPE 2N599 IN EQUIPMENT PROCURED ON CONTRACT DAAB05-72-C-4921.

Page 69 (page 1 of C 3). Change APPENDIX to APPENDIX I.

Appendix II. Delete appendix II and substitute the following.

'This change supersedes C 3, 17 August 1965.

APPENDIX II
GENERAL SUPPORT AND DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists repair parts required for the performance of general support and depot maintenance of the AN/VRM-1 and AN/VRM-1A

NOTE

No special tools, test, or support equipment is required.

2. General

This repair parts list is divided into the follow-. ing sections:

a. *Repair Parts-Section II.* A list of repair parts authorized for the performance of maintenance at the general support and depot level.

b. Index—Federal Stock Number and Reference Number Cross-Reference to Figure and Item Number or Reference Designation-Section III. A list of Federal stock numbers in ascending numerical sequence, followed by a list of reference numbers in ascending alphanumerit sequence, cross-referenced to the figure number and reference designation.

c. *Index-Reference Designation Cross-Reference to Page Number-Section IV.* A list of reference designations cross-referenced to page numbers.

3. Explanation of Columns

The following provides an explanation of columns in the tabular lists:

a. *Source, Maintenance, and Recoverability Codes (SMR), Column 1.*

(1) Source codes indicate the selection status and source for the listed item. Source codes are-

Code	*Explanation*
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
M	Repair parts which are not procured or stocked, but are to be manufactured at indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and 'can be assembled to form the required assembly at indicated maintenance categories.
X1	Repair parts which are not procured or stocked. The requirement for such items will be filled by use of the next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain same through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.

(2) Maintenance codes indicate the lowest category of maintenance authorized to install the listed item. The maintenance level codes a r e -

Code	*Explanation*
0	Organizational maintenance
H	General support maintenance
D	Depot maintenance

(3) Recoverability codes indicate whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are-

Code	*Explanation*
R	Repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
T	High-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.

b. Federal Stock Number, Column z. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. *Description, Column 3.* This column indicates the Federal item name and any additional description of the item required. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses.

d. *Unit of Meaaure (U/M), Column 4.* A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity *Incorporated in Unit, Column 5.* This column indicates the quantity of the item used in the AN/VRM-1 and AN/VRM-1A.

f. Allowances (30-Day DS/GS Maintenance, 1 Year Per Equipment (Contingency), and Depot Maintenance) Columns 6, 7, 8, and 9. Items authorized for requisition as required are identified with an asterisk in the allowance column.

g. *Illustrations, Column 10.* This column is divided as follows:

(1) *Figure number, column 10a.* Indicates the figure number in which the item is shown.

(2) *Item number or reference designation, column 10b.* Indicates the reference designation used to identify the item in the illustration.

1-4. Special Information

Identification of the usable on codes included in column 3 of section II are-

Code	*Used on-*
A	AN/VRM-1
B	AN/VRM-1A

NOTE

Where no usable codes are indicated, item is applicable to all models.

1-5. Location of Repair Parts

a. This manual contains two cross-reference indexes (sees. III and IV) to be used to locate a repair part when either the Federal stock number, reference number (manufacturer's part number), or reference designation is known. The first column in each index is prepared in numerical or alphanumerical sequence in ascending order. Where a federal stock number is not listed, refer to the reference number (manufacturer's part number) immediately following the Federal stock number column.

b. When the Federal stock number or reference number is known, follow the procedures given in (1) and (2) below.

(1) Refer to the index of Federal stock numbers (sec. HI) and locate the Federal stock number or reference number. The Federal stock number or reference number is cross-referenced to the applicable figure and reference designation.

(2) When the reference designation is determined, refer to the reference designation index (sec. IV). The reference designations are listed in alphanumeric ascending order and are cross-referenced to the page number on which they appear in the repair parts list (see II). Refer to the page number noted in the index and locate the reference designation in the repair parts list (col. 10b).

c. When the reference designation is known, follow the procedures given in *b(2)* above.

d. When neither the Federal stock number, reference number, nor reference designation is known, identify the part in the illustration and follow directions given in c above; or scrutinize column 3 of the repair parts list (sec. H).

1-6. Federal Supply Code for Manufacturers

Coda	*Manufacturer*
13467	Electrospace Corporation
71468	ITT Cannon Electric, Inc.
72619	Dialight Corporation
74970	E. F. Johnson Co.
80063	Army Electronics Command . Procurement and Production Directorate
80294	Bourns, Inc.
81349	Military Specifications
88044	Aeronautical Standards
96906	Military Standards

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
		TEST SET, RADIO AN/VRM-1 (THIS ITEM IS NONEXPENDABLE)	A												
		TEST SET, RADIO AN/VRM-1A (THIS ITEM IS NONEXPENDABLE)	B												
M-D		BAG, COTTON DUCK SMB416189 (80063)		EA	1										MP7000
P-H	6625-439-8762	CABLE ASSEMBLY, SPECIAL PURPOSE ELECTRICAL SMD416188 (80063)		EA	1				*	*	*	*	*	40	CX7899/VRM-1
P-H	6145-889-0645	CABLE C002MOF2160335 (81349)		EA	1				*	*	*	*	*	41	W7000
P-H	6145-889-0615	CABLE C002LOF2200215 (81349)		EA	1				*	*	*	*	*	41	W7001
M-D		BAND, MARKER, CABLE SCA21825-8 (80063)		EA	1									41	MP7100
M-D		CLAMP, CABLE SMC416190 (80063)		EA	1									41	MP7101
P-H	5935-995-9264	CONNECTOR, PLUG, ELECTRICAL MPT06W8-4S (71468)		EA	1				*	*	*	*	*	41	P7100
P-H	5935-999-3817	CONNECTOR, PLUG, ELECTRICAL SMC416262 (80063)		EA	1				*	*	*	*	*	41	P7101
P-H	5935-059-8664	CONNECTOR, RECEPTACLE, ELECTRICAL SMD416192 (80063)		EA	1				*	*	*	*	*	41	J7100
P-D	5305-576-2273	SCREW, MACHINE MS35239-35 (96906)		EA	2							*	*	41	H7100
P-D	5305-576-2273	SCREW, MACHINE MS35239-35 (96906)		EA	REF							*	*	41	H7101
P-D	5305-619-4409	SCREW, MACHINE MS35239-38 (96906)		EA	2							*	*	41	H7102
P-D	5305-619-4409	SCREW, MACHINE MS35239-38 (96906)		EA	REF							*	*	41	H7103
M-D		SHELL, ELECTRICAL CONNECTOR SMC416193 (80063)		EA	1									41	MP7102
P-O	5920-793-4653	FUSE, CARTRIDGE MS90078-7-1 (96906)		EA	5	*	*	*	*	*	*	*	*	40	F7000
P-O	5920-793-4653	FUSE, CARTRIDGE MS90078-7-1 (96906)		EA	REF	*	*	*	*	*	*	*	*	40	F7001
P-O	5920-793-4653	FUSE, CARTRIDGE MS90078-7-1 (96906)		EA	REF	*	*	*	*	*	*	*	*	40	F7002
P-O	5920-793-4653	FUSE, CARTRIDGE MS90078-7-1 (96906)		EA	REF	*	*	*	*	*	*	*	*	40	F7003
P-O	5920-793-4653	FUSE, CARTRIDGE MS90078-7-1 (96906)		EA	REF	*	*	*	*	*	*	*	*	40	F7004
P-O	6240-851-4352	LAMP, INCANDESCENT 330 (81349)		EA	1	*	*	*	*	*	*	*	*	40	DS7000
A-H-R		TEST SET, RADIO SMD416104 (80063)		EA	1									40	TS1777/VRM-1
P-H-T	6625-329-2979	AMPLIFIER, RECTIFIER SMD416184 (80063)		EA	1				*	*	*	*	*	42	A7400
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)		EA	4							*	*	42	H7408
XC1		CAPACITOR, FIXED ELECTROLYTIC CS13AD121K (81349)		EA	1									43	C7400
XC1		CAPACITOR, FIXED ELECTROLYTIC CS13JE150M (81349)		EA	3									43	C7401
XC1		CAPACITOR, FIXED ELECTROLYTIC CS13JE150M (81349)		EA	REF									43	C7402

SECTION II REPAIR PARTS FOR DIRECT SUPPORT GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X1		CAPACITOR, FIXED ELECTROLYTIC CS13E150M (81349)	EA	REF									43	C7404
X1		CAPACITOR, FIXED ELECTROLYTIC CS13AF470K (81349)	EA	1									43	C7403
X1		CONNECTOR, PLUG, ELECTRICAL SMB416155 (80063)	EA	1									43	P7401
X1		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	2									43	H7400
X1		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	REF									43	H7404
X1		PAD, TRANSISTOR SMB413797 (80063)	EA	2									43	E7400
X1		PAD, TRANSISTOR SMB413797 (80063)	EA	REF									43	E7401
X1		PAD, TRANSISTOR SMC413798 (80063)	EA	1									43	E7402
X1		PRINTED CIRCUIT BOARD SMB416186 (80063)	EA	1									43	TB7400
X1		REACTOR SMC413795 (80063)	EA	1									43	L7401
X1		RESISTOR, VARIABLE SMB416185-1 (80063)	EA	1									44	R7406
X1		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	2									43	H7401
X1		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	REF									43	H7405
X1		SCREW, MACHINE MS35233-6 (96906)	EA	2									43	H7402
X1		SCREW, MACHINE MS35233-6 (96906)	EA	REF									43	H7406
X1		WASHER, NONMETALLIC SMB416109 (80063)	EA	2									43	H7403
X1		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	1									43	H7407
X1		RESISTOR, FIXED, COMPOSITION RC07GF103K (81349)	EA	1									43	R7401
X1		RESISTOR, FIXED, COMPOSITION RC07GF104K (81349)	EA	1									43	R7402
X1		RESISTOR, FIXED, COMPOSITION RC07GF153K (81349)	EA	1									43	R7410
X1		RESISTOR, FIXED COMPOSITION RC07GF221K (81349)	EA	1									43	R7408
X1		RESISTOR, FIXED, COMPOSITION RC07GF224K (81349)	EA	1									43	R7403
X1		RESISTOR, FIXED, COMPOSITION RC07GF332K (81349)	EA	2									43	R7404
X1		RESISTOR, FIXED COMPOSITION RC07GF332K (81349)	EA	REF									43	R7407
X1		RESISTOR, FIXED, COMPOSITION RC07GF472K (81349)	EA	1									43	R7405
X1		RESISTOR, FIXED, COMPOSITION RC07GF682K (81349)	EA	1									43	R7409
X1		SEMICONDUCTOR DEVICE, DIODE 1N645 (81349)	EA	3									43	CR7401

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
XI		SEMICONDUCTOR DEVICE, DIODE 1N645 (81349)	EA	REF									43	CR7402
XI		SEMICONDUCTOR DEVICE, DIODE 1N645 (81349)	EA	REF									43	CR7403
XI		SEMICONDUCTOR DEVICE, DIODE 1N270 (81349)	EA	1									43	CR7404
XI		TRANSISTOR SMD413796 (80063)	EA	2									43	Q7402
XI		TRANSISTOR SMD413796 (80063)	EA	REF									43	Q7403
XI		TRANSISTOR 2N335 (81349)	EA	1									43	Q7401
P-H-T	6625-329-2886	AMPLIFIER, RECTIFIER SMD416174 (80063)	EA	1				*	*	*	*	*	42	A7600
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)	EA	4							*	*	42	H7608
XI		CAPACITOR, FIXED, CERAMIC DIELECTRIC SMC413567-4 (80063)	EA	7									45	C7601
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-4 (80063)	EA	REF									45	C7603
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMS413567-4 (80063)	EA	REF									45	C7604
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-4 (80063)	EA	REF									45	C7605
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-4 (80063)	EA	REF									45	C7607
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-4 (80063)	EA	REF									45	C7609
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-4 (80063)	EA	REF									45	C7610
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-14 (80063)	EA	1									45	C7613
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-22 (80063)	EA	1									45	C7608
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-25 (80063)	EA	1									45	C7602
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-27 (80063)	EA	1									45	C7612
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC CC20UJ070C (81349)	EA	1									45	C7606
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC CC20UKD10C (81349)	EA	1									45	C7611
XI		COIL, RADIO FREQUENCY SMB413738 (80063)	EA	2									45	L7601
XI		COIL, RADIO FREQUENCY SMB413738 (80063)	EA	REF									45	L7602
XI		COIL, RADIO FREQUENCY SMC416182 (80063)	EA	1									45	L7603
XI		CONNECTOR, PLUG, ELECTRICAL SMD416155 (80063)	EA	1									45	P7601
M-D		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	2									45	H7600
M-D		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	REF									45	H7604

SECTION II REPAIR PARTS FOR DIRECT SUPPORT GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
XI		PRINTED CIRCUIT BOARD SMC416177 (80063)		EA	1									45	TB7600
XI		RESISTOR, VARIABLE SMB416175-2 (80063)		EA	1									45	R7611
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)		EA	2									45	H7601
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)		EA	REF									45	H7605
P-D	5305-543-2761	SCREW, MACHINE MS35233-6 (96906)		EA	2							*	*	45	H7602
P-D	5305-543-2761	SCREW, MACHINE MS35233-6 (96906)		EA	REF							*	*	45	H7606
XI		WASHER, NONMETALLIC SMB416109-3 (80063)		EA	2									45	H7603
XI		WASHER, NONMETALLIC SMB416109-3 (80063)		EA	REF									45	H7607
XI		RESISTOR, FIXED, COMPOSITION RC07GF152K (81349)		EA	1									45	R7604
XI		RESISTOR, FIXED, COMPOSITION RC07GF182K (81349)		EA	1									45	R7605
XI		RESISTOR. FIXED, COMPOSITION RC07GF390K (81349)		EA	1									45	R7608
XI		RESISTOR, FIXED, COMPOSITION RC07GF392J (81349)		EA	1									45	R7606
XI		RESISTOR, FIXED, COMPOSITION RC07GF392J (81349)		EA	REF									45	R7607
XI		RESISTCR, FIXED, COMPOSITION RC07GF472K (81349)		EA	3									45	R7602
XI		RESISTOR, FIXED, COMPOSITION RC07GF472K (81349)		EA	REF									45	R7603
XI		RESISTOR, FIXED, COMPOSITION RC07GF472K (81349)		EA	REF									45	R7609
XI		RESISTOR, FIXED, COMPOSITION RC07GF510J (81349)		EA	2									45	R7612
XI		RESISTOR, FIXED, COMPOSITION RC07GF510J (81349)		EA	REF									45	R7613
XI		RESISTOR, FIXED, COMPOSITION RC07GF822K (81349)		EA	1									45	R7601
XI		SEMICONDUCTOR DEVICE, DIODE SMD416162 (80063)		EA	1									45	CR7602
XI		SEMICONDUCTOR DEVICE, DIODE 1N270 (81349)		EA	1									45	CR7601
XI		TRANSFORMER, RADIO FREQUENCY SMC413735 (80063)		EA	1									45	T7602
XI		TRANSFORMER, RADIO FREQUENCY SMC413740 (80063)		EA	1									45	T7601
XI		TRANSISTOR SMB416175-1 (80063)		EA	1									45	Q7602
XI		TRANSISTOR 2N502B (81349)		EA	1									45	Q7601
M-D		BUMPER SMB416156 (80063)	A	EA	4									46	MP7200
M-D		BUMPER SMB416456 (80063)	A	EA	REF									46	MP7201

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
M-D		BUMPER SMB416156 (80063)	A	EA	REF									46	MP7202
M-D		BUMPER SMB416156 (80063)	A	EA	REF									46	MP7203
P-D	6625-443-5523	CASE, TEST SET SMD416110 (80063)	A	EA	1							*	*	40	MP7204
P-D	6625-443-9955	CASE, TEST SET D3838-126 (13467)	B	EA	1							*	*	47	MP7204
M-D		BUMPER, RUBBER B3838-123 (13467)	B	EA	4									48	MP7239
M-D		BUMPER, RUBBER B3838-123 (13467)	B	EA	REF									48	MP7240
M-D		BUMPER, RUBBER B3838-123 (13467)	B	EA	REF									48	MP7241
M-D		BUMPER, RUBBER B3838-123 (13467)	B	EA	REF									48	MP7242
P-H	6625-059-8088	GASKET SMC416161 (80063)	B	EA	1				*	*	*	*	*	48	MP7243
X1		COVER, TEST SET CASE SMD416123 (80063)	A	EA	1									40	A7200
X1		COVER, TEST SET CASE D3838-125 (13467)	B	EA	1									47	A7200
M-D		BLOCK SMB416129 (80063)	A	EA	2									49	MP7205
M-D		BLOCK SMB416129 (80063)	B	EA	2									50	MP7205
P-D	5305-531-9520	SCREW, MACHINE MS35233-2 (96906)	A	EA	4							*	*	49	H7202
P-D	5305-531-9520	SCREW, MACHINE MS35233-2 (96906)	B	EA	4							*	*	50	H7202
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	8							*	*	49	H7203
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	8							*	*	50	H7203
M-D		BLOCK SMB416129 (80063)	A	EA	REF									49	MP7206
M-D		BLOCK SMB416129 (80063)	B	EA	REF									50	MP7206
P-D	5305-531-9520	SCREW, MACHINE MS35233-2 (96906)	A	EA	REF							*	*	49	H7226
P-D	5305-531-9520	SCREW, MACHINE MS35233-2 (96906)	B	EA	REF							*	*	50	H7226
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	REF							*	*	49	H7227
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	REF							*	*	50	H7227
M-D		BRACKET SMB416128 (80063)	A	EA	1									49	MP7207
M-D		BRACKET SMB416128 (80063)	B	EA	1									50	MP7207
P-D		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	A	EA	1							*	*	49	H7204
P-D		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	B	EA	1							*	*	50	H7204

SECTION 11 REPAIR PARTS FOR DIRECT SUPPORT. GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	A	EA	1							•	•	48	H7205
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	B	EA	1							•	•	50	H7205
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	A	EA	1							•	•	49	H7206
P-D	5310-275-1292	WASHER, FLAT AN960-2 (8804)	B	EA	1							•	•	50	H7206
M-D		CLIP, ELECTRICAL SMB416295-1 (80063)	A	EA	1									49	E7200
M-D		CLIP, ELECTRICAL SMB416295-1 (80063)	B	EA	1									50	E7200
M-D		CLIP, ELECTRICAL SMC416126-2 (80063)	A	EA	1									49	E7201
M-D		CLIP, ELECTRICAL SMC416126-2 (80063)	B	EA	1									49	E7201
P-D	6625-443-5522	COVER, TEST SET CASE, SUBASSEMBLY SMD416132 (80063)	A	EA	1							•	•	49	MP7208
P-D	6625-443-9957	COVER, TEST SET CASE, SUBASSEMBLY D3838-115 (13467)	B	EA	1							•	•	50	MP7208
M-D		PIN SMB416131 (80063)	A	EA	1									49	MP7209
M-D		PIN SMB416131 (80063)	B	EA	1									50	MP7209
P-O		PLATE, INSTRUCTION SMC416142 (80063)	A	EA	1	•	•	•	•	•	•	•	•	40	A7202
P-O		PLATE, INSTRUCTION SMC416142 (80063)	B	EA	1	•	•	•	•	•	•	•	•	47	A7202
M-D		CLAMP, LOOP SMB416143-1 (80063)	A	EA	2									49	MP7210
M-D		CLAMP, LOOP SMB416143-1 (80063)	B	EA	2									50	MP7210
M-D		EYELET, METALLIC SMC413542-27 (80063)	A	EA	2									49	H7207
M-D		EYELET, METALLIC SMC413542-27 (80063)	B	EA	2									50	H7207
M-D		CLAMP, LOOP SMB416143 (80063)	A	EA	REF									49	MP7211
M-D		CLAMP, LOOP SMB416143 (80063)	B	EA	REF									50	MP7211
M-D		EYELET, METALLIC MC413542-27 (80063)	A	EA	REF									49	H7228
M-D		EYELET, METALLIC MC413542-27 (80063)	B	EA	REF									50	H7228
P-D	6625-857-5278	PLATE, INSTRUCTION SUBASSEMBLY SMC416144 (80063)	A	EA	1							•	•	49	MP7212
P-D	6625-857-5278	PLATE, INSTRUCTION SUBASSEMBLY SMC416144 (80063)	B	EA	1							•	•	50	MP7212
P-D	6625-329-3385	STRIKE SMC416145 (80063)	A	EA	1							•	•	49	MP7213
P-D	6625-329-3385	STRIKE SMC416145 (80063)	B	EA	1							•	•	47	MP7213
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	A	EA	2							•	•	50	H7208

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	B	EA	2							*	*	47	H7208
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	A	EA	REF							*	*	50	H7229
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	B	EA	REF							*	*	47	H7229
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	A	EA	2							*	*	50	H7209
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	B	EA	2							*	*	47	H7209
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	A	EA	REF							*	*	50	H7230
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	B	EA	REF							*	*	47	H7230
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	2							*	*	50	H7210
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	2							*	*	47	H7210
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	REF							*	*	50	H7231
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	REF							*	*	47	H7231
P-O		PLATE, INSTRUCTION SMC416146 (80063)	A	EA	1	*	*	*	*	*	*	*	*	50	A7203
P-O		PLATE, INSTRUCTION SMC416146 (80063)	B	EA	1	*	*	*	*	*	*	*	*	47	A7203
M-D		BUMPER SMB416149 (80063)	A	EA	2									49	MP7214
M-D		BUMPER SMB416149 (80063)	B	EA	2									47	MP7214
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	A	EA	4							*	*	49	H7211
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	B	EA	4							*	*	47	H7211
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	A	EA	4							*	*	49	H7212
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	B	EA	4							*	*	47	H7212
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	4							*	*	49	H7213
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	4							*	*	47	H7213
M-D		BUMPER SMB416149 (80063)	A	EA	REF									49	MP7215
M-D		BUMPER SMB416149 (80063)	B	EA	REF									47	MP7215
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	A	EA	REF							*	*	49	H7239
P-D	5305-531-9521	SCREW, MACHINE MS35233-3 (96906)	B	EA	REF							*	*	47	H7239
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	A	EA	REF							*	*	49	H7240
P-D	5310-275-1292	WASHER, FLAT AN960-2 (88044)	B	EA	REF							*	*	47	H7240

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	REF							*	*	49	H7241
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	REF							*	*	47	H7241
M-D		CLAMP, LOOP SMB416147-1 (80063)	A	EA	2									49	MP7216
M-D		CLAMP, LOOP SMB416147-1 (80063)	B	EA	2									50	MP7216
M-D		CLAMP, LOOP SMB416147-1 (80063)	A	EA	REF									49	MP7217
M-D		CLAMP, LOOP SMB416147-1 (80063)	B	EA	REF									50	MP7217
M-D		EYELET, METALLIC SMC413542-27 (80063)	A	EA	2									49	H7214
M-D		EYELET, METALLIC SMC413542-27 (80063)	B	EA	2									50	H7214
M-D		EYELET, METALLIC SMC413542-27 (80063)	A	EA	REF									49	H7232
M-D		EYELET, METALLIC SMC413542-27 (80063)	B	EA	REF									50	H7232
P-D	6625-857-5277	PLATE, INSTRUCTION SMD416148 (80063)	A	EA	1							*	*	49	MP7218
P-D	6625-857-5277	PLATE, INSTRUCTION SMD416148 (80063)	BQ	EA	1							*	*	50	MP7218
P-O	6625-345-8100	COVER GASKET SMC416125 (80063)	A	EA	1	*	*	*	*	*	*	*	*	49	MP7219
P-O		COVER GASKET C3838-118 (13467)	B	EA	1	*	*	*	*	*	*	*	*	47	MP7219
X2-D		SLIDE SMC416128 (80063)	A	EA	1									49	MP7220
X2-D		SLIDE SMC416128 (80063)	B	EA	1									50	MP7220
X2-D		SLIDER SMB416127 (80063)	A	EA	2									49	MP7221
X2-D		SLIDER SMB416127 (80063)	B	EA	2									50	MP7221
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	A	EA	4							*	*	49	H7215
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	B	EA	4							*	*	50	H7215
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	A	EA	REF							*	*	49	H7216
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	B	EA	REF							*	*	50	H7216
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	REF							*	*	49	H7233
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	REF							*	*	50	H7233
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	REF							*	*	49	H7234
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	REF							*	*	50	H7234
X2-D		SLIDER SMB416127 (80063)	A	EA	REF									49	MP7222

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X2-D		SLIDER SMB416127 (80063)	B	EA	REF									50	MP7222
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	A	EA	REF							*	*	49	H7235
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	B	EA	REF							*	*	50	H7235
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	A	EA	REF							*	*	49	H7236
P-D	5305-543-2759	SCREW, MACHINE MS35233-4 (96906)	B	EA	REF							*	*	50	H7236
P-D	5310-543-5060	WASHER, LOCK MS35233-4 (96906)	A	EA	REF							*	*	49	H7237
P-D	5310-543-5060	WASHER, LOCK MS35233-4 (96906)	B	EA	REF							*	*	50	H7237
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	A	EA	REF							*	*	49	H7238
P-D	5310-543-5060	WASHER, LOCK MS35338-39 (96906)	B	EA	REF							*	*	50	H7238
M-D		SPRING, FLAT SMB416130 (80063)	A	EA	1									49	MP7223
M-D		SPRING, FLAT SMB416130 (80063)	B	EA	1									50	MP7223
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)	A	EA	2									49	MP7225
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)	B	EA	2									50	MP7225
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)	A	EA	REF									49	MP7224
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)	B	EA	REF									50	MP7224
P-H	6625-059-9825	TEST SET, SUB ASSEMBLY SMD416169 (80063)		EA	1				*	*	*	*	*	51	A7500
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)		EA	4							*	*	51	H7513
P-D	5310-167-0815	WASHER, FLAT AN960-4 (88044)		EA	4							*	*	51	H7514
X1		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413707-6 (80063)		EA	1									52	C7501
X1		COIL, RADIO FREQUENCY SMC413577 (80063)		EA	1									52	L7501
X1		CONNECTOR, PLUG, ELECTRICAL SMD416155 (80063)		EA	1									52	P7501
X1		WASHER, NONMETALLIC SMB416109-1 (80063)		EA	2									52	H7500
X1		WASHER, NONMETALLIC SMB416109-1 (80063)		EA	REF									52	H7504
X1		FILTER, BANDPASS SMD416173 (80063)		EA	1									52	FL7501
P-D	5310-934-9739	NUT, PLAIN HEXAGON MS35649-42 (96906)		EA	2							*	*	51	H7501
P-D	5310-934-9739	NUT, PLAIN HEXAGON MS35649-42 (96906)		EA	REF							*	*	51	H7505
P-D	5310-616-3554	WASHER, LOCK MS35335-29 (96906)		EA	2							*	*	51	H7502

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERA SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-D	5310-616-3554	WASHER, LOCK MS35335-29 (96906)		EA	REF							*	*	51	H7506
X1		PRINTED CIRCUIT BOARD SMD416171 (80063)		EA	1									52	TB7500
X1		RESISTOR, ADJUSTABLE SMB416170-1 (80063)		EA	1									44	R7501
X1		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)		EA	2									52	H7502
X1		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)		EA	REF									52	H7508
X2-H	5305-543-2761	SCREW, MACHINE MS35233-6 (96906)		EA	2									52	H7509
X2-H	5305-543-2761	SCREW, MACHINE MS35233-6 (96906)		EA	REF									52	H7510
X1		WASHER, NONMETALLIC SMB416109-3 (80063)		EA	2									52	H7511
X1		WASHER, NONMETALLIC SMB416109-3 (80063)		EA	REF									52	H7512
P-H	6625-099-8088	GASKET SMC416161 (80063)	A	EA	1				*	*	*	*	*	46	MP7500
P-D	6625-930-2838	PANEL, TEST ELECTICAL SMD416219 (80063)		EA	1							*	*	42	A7900
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)		EA	4							*	*	44	H7940
P-D	5305-579-3021	SCREW, MACHINE MS35233-26 (96906)		EA	2							*	*	44	H7941
P-D	5305-857-4335	SCREW, MACHINE SMB416201 (80063)		EA	8							*	*	51	H7942
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)		EA	8									51	H7943
P-D	5975-548-6514	BOX, CONNECTOR ELECTRICAL AN3064-6 (88044)		EA	1							*	*	53	MP7900
P-D	5310-734-5540	NUT, PLAIN, HEXAGON AN3066-6 (88044)		EA	1							*	*	53	H7900
M-D		BRACKET SMC416250 (80063)		EA	1									54	MP7901
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)		EA	2							*	*	54	H7901
P-D	5910-891-9156	CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-4 (80063)		EA	1							*	*	54	C7901
P-H-T	6625-443-5524	TEST SET, SUB ASSEMBLY SMC416180 (80063)		EA	1				*	*	*	*	*	54	A7901
X1		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-7 (80063)		EA	1									54	C7902
X1		CAPACITOR, FIXED, ELECTROLYTIC SMC413843-3 (80063)		EA	1									54	C7903
X1		RESISTOR, FIXED, COMPOSITION RC07GF102J (81349)		EA	1									54	R7921
X1		RESISTOR, FIXED, COMPOSITION RC07GF220J (81349)		EA	1									54	R7918
X1		RESISTOR, FIXED, FILM RN65D1301F (81349)		EA	1									54	R7920
X1		TERMINAL BOARD SMC416268 (80063)		EA	1									54	TB7900

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
)	5920-793-4653	FUSE, CARTRIDGE MS90078-7-1 (96906)	EA	1	*	*	*	*	*	*	*	*	42	F7901
-H	5920-280-4168	FUSEHOLDER SMC416221 (80063)	EA	1				*	*	*	*	*	42	XF7901
P-D	5310-543-4385	WASHER, LOCK MS35333-46 (96906)	EA	1							*	*	42	H7902
P-D	5340-984-9275	GROMMET SMB415142-3 (80063)	EA	1							*	*	53	MP7902
M-D		HANDLE, BOW SMC416223 (80063)	EA	2									55	MP7903
P-D	5305-543-5059	SCREW, MACHINE MS35265-29 (96906)	EA	4							*	*	55	H7903
P-D	5305-543-5059	SCREW, MACHINE MS35265-29 (96906)	EA	REF							*	*	55	H7922
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)	EA	4									55	H7904
M-D		WASHER, NONMETALLIC SMB416109-2 (80063)	EA	REF									55	H7923
P-D	5310-045-4007	WASHER, LOCK MS35338-41 (96906)	EA	4							*	*	55	H7905
P-D	5310-045-4007	WASHER, LOCK MS35338-41 (96906)	EA	REF							*	*	55	H7924
M-D		HANDLE, BOW SMC416223 (80063)	EA	REF									56	MP7904
P-D	5305-543-5059	SCREW, MACHINE MS35265-29 (96906)	EA	REF							*	*	56	H7925
P-D	5305-543-5059	SCREW, MACHINE MS35265-29 (96906)	EA	REF							*	*	56	H7926
D		WASHER, NONMETALLIC SMB416109-2 (80063)	EA	REF									56	H7927
-D		WASHER, NONMETALLIC SMB416109-2 (80063)	EA	REF									56	H7928
P-D	5310-045-4007	WASHER, LOCK MS35338-41 (96906)	EA	REF							*	*	56	H7929
P-D	5310-045-4007	WASHER, LOCK MS35338-41 (96906)	EA	REF							*	*	56	H7930
P-D	5935-578-3489	JACK, TIP 105602 (74970)	EA	1							*	*	42	TP7900A
P-O	5355-059-6285	KNOB SMD416222 (80063)	EA	1	*	*	*	*	*	*	*	*	42	MP7905
P-O	5305-059-6809	SCREW, MACHINE SMB416220-5 (80063)	EA	1	*	*	*	*	*	*	*	*	42	H7907
P-O	6240-851-4352	LAMP, INCANDESCENT 330 (81349)	EA	2	*	*	*	*	*	*	*	*	42	DS7901
P-O	6240-851-4352	LAMP, INCANDESCENT 330 (81349)	EA	REF	*	*	*	*	*	*	*	*	42	DS7902
P-O	6210-857-5322	LIGHT, INDICATOR RED 1778430XP10971 (72619)	EA	1	*	*	*	*	*	*	*	*	42	XDS7901
P-O	6210-857-5323	LIGHT, INDICATOR GREEN 1778430XP10971 (72619)	EA	1	*	*	*	*	*	*	*	*	42	XDS7902
P-D	5975-295-9325	NUT, COUPLING AN3054-6 (88044)	EA	1							*	*	53	MP7906
M-D		PANEL, TEST ELECTRICAL SMD416226 (80063)	EA	1									54	MP7907

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-H	5330-618-0799	PACKING, PREFORMED MS28775-18 (96906)	EA	1				•	•	•	•	•	53	MP7908
P-H-T	6625-857-5296	PROBE, TEST ASSEMBLY SMD416196 (80063)	EA	1				•	•	•	•	•	53	A7903
P-D		CABLE SMB416215 (80063)	EA	1							•	•	53	W7304
XI		BUSHING SMB416198 (80063)	EA	1									53	MP7909
XI		CAP ASSEMBLY SMB416202 (80063)	EA	1									53	MP7910
P-D	6625-889-0787	CABLE ASSEMBLY, GROUND SMC416209 (80063)	EA	1							•	•	53	W7901
P-D	5305-558-4888	SCREW, MACHINE MS35223-13 (96906)	EA	1							•	•	53	H7908
P-D	5310-616-8554	WASHER, LOCK MS35335-29 (96906)	EA	1							•	•	53	H7909
P-D	5310-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	1							•	•	53	H7910
M-D		BOOT SMB416211 (80063)	EA	1									53	MP7911
XI		CLIP, ELECTRICAL SMC416212 (80063)	EA	1									53	MP7912
XI		INSULATOR SMB416213 (80063)	EA	1									53	E7920
XI		TERMINAL, LUG SMB416210-1 (80063)	EA	1									53	E7921
XI		CIRCUIT ASSEMBLY, PROBE SMD416214 (80063)	EA	1									53	A7904
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-3 (80063)	EA	3									57	C7301
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-3 (80063)	EA	REF									57	C7302
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-3 (80063)	EA	REF									57	C7303
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-14 (80063)	EA	1									57	C7304
XI		PAD, TRANSISTOR SMC416153 (80063)	EA	1									57	E7300
XI		PRINTED CIRCUIT BOARD SMC416216 (80063)	EA	1									57	TB7300
XI		REACTOR SMB416215-2 (80063)	EA	1									57	L7301
XI		RESISTOR, FIXED COMPOSITION RC07GF103K (81349)	EA	1									57	R7302
XI		RESISTOR, FIXED, COMPOSITION RC07GF153K (81349)	EA	1									57	R7301
XI		RESISTOR, FIXED, COMPOSITION RC07GF271J (81349)	EA	1									57	R7304
XI		RESISTOR, FIXED, COMPOSITION RC07GF471J (81349)	EA	1									57	R7303
XI		TRANSISTOR 2N706 (81349)	EA	1									57	Q7301
XI		SHIELD ASSEMBLY SMC416205 (80063)	EA	1									53	MP7913

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X1		SLEEVE SMB416199 (80063)	EA	1									53	MP7914
P-O	6625-329-3312	TIP, TEST PROBE SMB416106 (80063)	EA	2	*	*	*	*	*	*	*	*	53	E7922
P-O	6625-329-3312	TIP, TEST, PROBE SMB416106 (80063)	EA	REF	*	*	*	*	*	*	*	*	40	E7923
P-H	5905-258-8713	RESISTOR, FIXED, FILM RN65D1301F (81349)	EA	1				*	*	*	*	*	54	R7917
P-H	5905-849-0743	RESISTOR, FIXED, WIREWOUND RE65G24R9 (81349)	EA	1				*	*	*	*	*	54	R7901
P-D		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	2							*	*	54	H7911
P-D		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	REF							*	*	54	H7931
P-D	5305-687-6535	SCREW, MACHINE MS35239-11 (96906)	EA	2							*	*	54	H7912
P-D	5305-687-6535	SCREW, MACHINE MS35239-11 (96906)	EA	REF							*	*	54	H7932
P-H	5961-893-5939	SEMICONDUCTOR DEVICE, DIODE 1N2980B (81349)	EA	1				*	*	*	*	*	54	CR7902
P-H	5961-577-6084	SEMICONDUCTOR DEVICE, DIODE 1N645 (81349)	EA	1				*	*	*	*	*	54	CR7901
P-H	5930-615-6330	SWITCH TOGGLE SMC416224 (80063)	EA	1				*	*	*	*	*	54	S7901
P-D		INSERT SMB416208 (80063)	EA	1							*	*	51	H7913
P-D		WASHER, LOCK SMB416220-7 (80063)	EA	1							*	*	51	H7914
P-D		TERMINAL, STUD SMB416220-4 (80063)	EA	6							*	*	58	E7903
P-D	5305-531-0298	SCREW, MACHINE MS35265-15 (96906)	EA	2							*	*	58	H7915
P-D	5310-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	6							*	*	58	H7916
P-D		TERMINAL, STUD SMB416220-4 (80063)	EA	REF							*	*	58	E7912
P-D	5305-531-0298	SCREW, MACHINE MS35265-15 (96906)	EA	REF							*	*	58	H7933
P-D	5310-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	REF							*	*	58	H7934
P-D		TERMINAL, STUD SMB416220-4 (80063)	EA	REF							*	*	54	E7901
P-D	5305-271-8410	SCREW, MACHINE AN507-440-3 (88044)	EA	4							*	*	54	H7917
P-D	5310-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	REF							*	*	54	H7918
P-D		TERMINAL, STUD SMB416220-4 (80063)	EA	REF							*	*	54	E7902
P-D	5305-271-8410	SCREW, MACHINE AN507-440-3 (88044)	EA	REF							*	*	54	H7935
P-D	5310-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	REF							*	*	54	H7936
P-D		TERMINAL, STUD SMB416220-4 (80063)	EA	REF							*	*	54	E7910

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-D	5305-271-8410	SCREW, MACHINE AN507-440-3 (88044)	EA	REF							•	•	54	H7919
P-D	5305-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	REF							•	•	54	H7920
P-D		TERMINAL, STUD SMB416220-4 (80063)	EA	REF							•	•	54	E7911
P-D	5305-271-8410	SCREW, MACHINE AN507-440-3 (88044)	EA	REF							•	•	54	H7937
P-D	5310-543-2410	WASHER, LOCK MS35338-40 (96906)	EA	REF							•	•	54	H7938
P-D	5330-530-0120	WASHER, NONMETALLIC AN3067W3 (88044)	EA	1							•	•	53	MP7915
M-D		WIRING HARNESS SMD416264 (80063)	EA	1									54	W7900
P-H	5935-821-0920	CONNECTOR, RECEPTACLE ELECTRICAL MS3114E8-4P (96906)	EA	1				•	•	•	•	•	54	J7902
P-H	5935-059-8752	CONNECTOR, RECEPTACLE ELECTRICAL SMD416225 (80063)	EA	5				•	•	•	•	•	54	J7903
P-H	5935-059-8752	CONNECTOR, RECEPTACLE ELECTRICAL SMD416225 (80063)	EA	REF				•	•	•	•	•	54	J7904
P-H	5935-059-8752	CONNECTOR, RECEPTACLE ELECTRICAL SMD416225 (80063)	EA	REF				•	•	•	•	•	54	J7905
P-H	5935-059-8752	CONNECTOR, RECEPTACLE ELECTRICAL SMD416225 (80063)	EA	REF				•	•	•	•	•	54	J7906
P-H	5935-059-8752	CONNECTOR, RECEPTACLE ELECTRICAL SMD416225 (80063)	EA	REF				•	•	•	•	•	54	J7907
P-H	6625-069-9826	SWITCH ASSEMBLY SMD416253 (80063)	EA	1				•	•	•	•	•	54	A7902
P-D	5905-279-4792	RESISTOR, FIXED, FILM RN65D1002F (81349)	EA	1							•	•	58	R7905
P-D	5905-615-6485	RESISTOR, FIXED, FILM RN65D1053F (81349)	EA	1							•	•	58	R7903
P-D	5905-681-3222	RESISTOR, FIXED, FILM RN65D1101F (81349)	EA	1							•	•	55	R7907
P-D	5905-577-9412	RESISTOR, FIXED, FILM RN65D2433F (81349)	EA	1							•	•	56	R7909
P-D	5905-060-2484	RESISTOR, FIXED, FILM RN65D2612F (81349)	EA	1							•	•	55	R7906
P-D	5905-818-5548	RESISTOR, FIXED, FILM RN65D4020F (81349)	EA	1							•	•	56	R7914
P-D	5905-284-2464	RESISTOR, FIXED, FILM RN65D4750F (81349)	EA	1							•	•	55	R7908
P-D	5905-959-0558	RESISTOR, FIXED, FILM RN65D5113F (81349)	EA	1							•	•	58	R7904
P-D	5905-814-0738	RESISTOR, FIXED, FILM RN65D5231F (81349)	EA	1							•	•	56	R7919
P-D	5905-702-1157	RESISTOR, FIXED, FILM RN65D66R5F (81349)	EA	1							•	•	56	R7913
P-D	5905-995-4285	RESISTOR, FIXED, FILM RN65D84R5F (81349)	EA	1							•	•	56	R7911
P-D	5905-989-5584	RESISTOR, FIXED, FILM RN65D8450F (81349)	EA	1							•	•	56	R7910
P-D	5905-765-5470	RESISTOR, FIXED, FILM RN65D8451F (81349)	EA	1							•	•	58	R7902

SECITON II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-D	5930-999-3814	SWITCH, ROTARY SMD416255 (80063)	EA	1							*	*	54	S7902
P-D	5940-614-0537	TERMINAL, LUG MS35431-1 (96906)	EA	4							*	*	56	E7906
P-D	5310-616-3554	WASHER, LOCK MS35335-29 (96906)	EA	4							*	*	56	H7939
P-D	5940-614-0537	TERMINAL, LUG MS35431-1 (96906)	EA	REF							*	*	54	E7907
P-D	5310-616-3554	WASHER, LOCK MS35335-29 (96906)	EA	REF							*	*	54	H7944
P-D	5940-614-0537	TERMINAL, LUG MS35431-1 (96906)	EA	REF							*	*	56	E7908
P-D	5310-616-3554	WASHER, LOCK MS35335-29 (96906)	EA	REF							*	*	56	H7945
P-D	5940-614-0537	TERMINAL, LUG MS35431-1 (96906)	EA	REF							*	*	54	E7909
P-D	5310-616-3554	WASHER, LOCK MS35335-29 (96906)	EA	REF							*	*	54	H7946
M-D		PLATE, IDENTIFICATION SMC416107 (80063)	EA	1									42	MP7226
P-D	5320-119-6754	RIVET, SOLID MS20470AD2-3 (96906)	EA	2							*	*	42	H7223
P-D	5320-119-6754	RIVET, SOLID MS20470AD2-3 (96906)	EA	REF							*	*	42	H7242
M-D		PLATE ASSEMBLY SMC416256 (80063)	EA	1									44	MP7227
P-H-T	6625-810-5194	TEST SET, SUB ASSEMBLY SMD416150 (80063)	EA	1				*	*	*	*	*	51	A7800
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)	EA	4							*	*	51	H7817
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413707-2 (80063)	EA	2									59	C7801
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413707-2 (80063)	EA	REF									59	C7802
XI		CONNECTOR, PLUG, ELECTRICAL SMD416155 (80063)	EA	1									59	P7801
XI		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	2									59	H7800
XI		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	REF									59	H7807
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	6									59	E7800
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	REF									59	E7801
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	REF									59	E7802
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	REF									59	E7803
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	REF									59	E7804
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	REF									59	E7805
XI		PAD, TRANSISTOR SMC416153 (80063)	EA	1									59	E7806

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
XI		PRINTED CIRCUIT BOARD SMD416152 (80063)	EA	1									59	TB7800
XI		RESISTOR, VARIABLE 220W526502 (80294)	EA	3									44	R7801
M-D		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	4									59	R7801
XI		SCREW, MACHINE MS35233-8 (96906)	EA	4									59	R7802
XI		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	4									59	R7803
XI		RESISTOR, VARIABLE 220W526502 (80249)	EA	REF									44	R7803
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	REF									59	R7809
XI		SCREW, MACHINE MS35233-8 (96906)	EA	REF									59	R7810
XI		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	REF									59	R7812
XI		RESISTOR, VARIABLE 220W526502 (80249)	EA	REF									44	R7816
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	REF									59	R7804
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	REF									59	R7808
XI		SCREW, MACHINE MS35233-6 (96906)	EA	2									59	R7805
XI		SCREW, MACHINE MS35233-6 (96906)	EA	REF									59	R7811
XI		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	REF									59	R7806
XI		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	REF									59	R7816
XI		RESISTOR, FIXED, COMPOSITION RC07GF102J (81349)	EA	1									59	R7807
XI		RESISTOR, FIXED, COMPOSITION RC07GF104K (81349)	EA	1									59	R7805
XI		RESISTOR, FIXED, COMPOSITION RC07GF122J (81349)	EA	1									59	R7814
XI		RESISTOR, FIXED, COMPOSITION RC07GF150J (81349)	EA	1									59	R7811
XI		RESISTOR, FIXED, COMPOSITION RC07GF182J (81349)	EA	1									59	R7806
XI		RESISTOR, FIXED, COMPOSITION RC07GF220J (81349)	EA	1									59	R7815
XI		RESISTOR, FIXED, COMPOSITION RC07GF221J (81349)	EA	3									59	R7802
XI		RESISTOR, FIXED, COMPOSITION RC07GF221J (81349)	EA	REF									59	R7809
XI		RESISTOR, FIXED, COMPOSITION RC07GF221J (81349)	EA	REF									59	R7812
XI		RESISTOR, FIXED, COMPOSITION RC07GF272J (81349)	EA	1									59	R7813
XI		RESISTOR, FIXED RC07GF471J (81349)	EA	1									59	R7808

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
XI		RESISTOR, FIXED, COMPOSITION RC07GF472K (81349)	EA	1									59	R7804
XI		RESISTOR, FIXED, COMPOSITION RC07GF510J (81349)	EA	1									59	R7818
XI		RESISTOR, FIXED, COMPOSITION RC07GF822J (81349)	EA	1									59	R7819
XI		SEMICONDUCTOR DEVICE, DIODE 2N887 (81349)	EA	1									59	CR7803
XI		SEMICONDUCTOR DEVICE, DIODE 1N645 (81349)	EA	2									59	CR7801
XI		SEMICONDUCTOR DEVICE, DIODE 1N645 (81349)	EA	REF									59	CR7802
XI		TRANSISTOR 2N491 (81349)	EA	2									59	Q7801
XI		TRANSISTOR 2N491 (81349)	EA	REF									59	Q7806
XI		TRANSISTOR 2N697 (81349)	EA	4									59	Q7802
XI		TRANSISTOR 2N697 (81349)	EA	REF									59	Q7803
XI		TRANSISTOR 2N697 (81349)	EA	REF									59	Q7804
XI		TRANSISTOR 2N697 (81349)	EA	REF									59	Q7805
P-H-T	6625-810-5193	TEST SET, SUB ASSEMBLY SMD416157 (80063)	EA	1									51	A7700
P-D	5305-638-0653	SCREW, MACHINE MS35233-14 (96906)	EA	4							*	*	51	H7708
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	8									60	C7705
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7706
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7707
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7709
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7710
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7711
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7712
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7716
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	3									60	C7701
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7702
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMC413567-1 (80063)	EA	REF									60	C7703
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-14 (80063)	EA	1									60	C7714
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC SMD413568-26 (80063)	EA	1									60	C7704

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC CC200J100D (81349)	EA	1									60	C7715
XI		CAPACITOR, FIXED CERAMIC DIELECTRIC CC20UJ200G (81349)	EA	1									60	C7713
XI		CAPACITOR, VARIABLE GLASS DIELECTRIC SMB416158-3 (80063)	EA	1									44	C7708
XI		COIL, RADIO FREQUENCY SMC413977 (80063)	EA	1									60	L7701
XI		COIL, RADIO FREQUENCY SMB413738 (80063)	EA	2									60	L7702
XI		COIL, RADIO FREQUENCY SMB413738 (80063)	EA	REF									60	L7703
XI		COIL, RADIO FREQUENCY SMC416163 (80063)	EA	1									60	L7704
XI		COIL, RADIO FREQUENCY SMC416167 (80063)	EA	1									60	L7705
XI		CONNECTOR, PLUG, ELECTRICAL SMB416155 (80063)	EA	1									60	P7701
XI		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	2									60	R7700
XI		WASHER, NONMETALLIC SMB416109-1 (80063)	EA	REF									60	R7704
XI		PAD, TRANSISTOR SMC413798 (80063)	EA	1									60	E7700
XI		PAD, TRANSISTOR SMC416153 (80063)	EA	1									60	E7701
XI		PRINTED CIRCUIT BOARD SMB416159 (80063)	EA	1									60	TB7700
XI		RESISTOR, ADJUSTABLE SMB416158-2 (80063)	EA	2									44	R7708
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	2									60	R7701
XI		SCREW, MACHINE MS35233-8 (96906)	EA	2									60	R7702
XI		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	2									60	R7703
XI		RESISTOR, ADJUSTABLE SMB416158-2 (80063)	EA	REF									44	R7718
XI		NUT, SELF-LOCKING, HEXAGON SMC413525-6 (80063)	EA	REF									60	R7705
XI		SCREW, MACHINE MS35233-8 (96906)	EA	REF									60	R7706
XI		WASHER, NONMETALLIC SMB416109-3 (80063)	EA	REF									60	R7707
XI		RESISTOR, FIXED, COMPOSITION RC07GF101K (81349)	EA	1									60	R7712
XI		RESISTOR, FIXED, COMPOSITION RC07GF103K (81349)	EA	1									60	R7715
XI		RESISTOR, FIXED, COMPOSITION RC07GF152K (81349)	EA	2									60	R7713
XI		RESISTOR, FIXED, COMPOSITION RC07GF152K (81349)	EA	REF									60	R7714
XI		RESISTOR, FIXED, COMPOSITION RC07GF221K (81349)	EA	2									60	R7701

SECTION II REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
		RESISTOR, FIXED, COMPOSITION RC07GF221K (81349)	EA	REF									60	R7703
		RESISTOR, FIXED, COMPOSITION RC07GF272 (81349)	EA	1									60	R7704
		RESISTOR, FIXED, COMPOSITION RC07GF332K (81349)	EA	3									60	R7710
		RESISTOR, FIXED, COMPOSITION RC07GF332K (81349)	EA	REF									60	R7711
		RESISTOR, FIXED, COMPOSITION RC07GF332K (81349)	EA	REF									60	R7717
		RESISTOR, FIXED, COMPOSITION RC07GF392K (81349)	EA	1									60	R7706
		RESISTOR, FIXED, COMPOSITION RC07GF470K (81349)	EA	1									60	R7702
		RESISTOR, FIXED, COMPOSITION RC07GF472K (81349)	EA	1									60	R7705
		RESISTOR, FIXED, COMPOSITION RC07GF562K (81349)	EA	2									60	R7707
		RESISTOR, FIXED, COMPOSITION RC07GF562K (81349)	EA	REF									60	R7709
		RESISTOR, FIXED, COMPOSITION RC07GF682K (81349)	EA	1									60	R7716
		SEMICONDUCTOR DEVICE, DIODE SMD416162 (80063)	EA	2									60	CR7701
		SEMICONDUCTOR DEVICE, DIODE SMD416162 (80063)	EA	REF									60	CR7702
		TRANSFORMER, RADIO FREQUENCY SMC416165 (80063)	EA	1									60	T7702
		TRANSISTOR 2N502B (81349)	EA	1									60	Q7702
		TRANSISTOR SMB416158-1 (80063)	EA	1									60	Q7701
		TRANSISTOR 2N706 (81349)	EA	1									60	Q7703

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF. DESIGNATION
5305-059-6809	42	H7907
5305-271-8410	54	H7917
5305-271-8410	54	H7919
5305-271-8410	54	H7935
5305-271-8410	54	H7937
5305-531-0298	58	H7915
5305-531-0298	58	H7933
5305-531-9520	49	H7202
5305-531-9520	49	H7226
5305-531-9520	50	H7202
5305-531-9520	50	H7226
5305-531-9521	40	H7208
5305-531-9521	40	H7299
5305-531-9521	47	H7208
5305-531-9521	47	H7211
5305-531-9521	47	H7229
5305-531-9521	47	H7239
5305-531-9521	49	H7205
5305-531-9521	49	H7211
5305-531-9521	49	H7239
5305-531-9521	50	H7205
5305-543-2410	54	H7920
5305-543-2759	49	H7215
5305-543-2759	49	H7216
5305-543-2759	49	H7235
5305-543-2759	49	H7236
5305-543-2759	50	H7215
5305-543-2759	50	H7216
5305-543-2759	50	H7235
5305-543-2759	50	H7236
5305-543-2761	45	H7602
5305-543-2761	45	H7606
5305-543-2761	52	H7509
5305-543-2761	52	H7510
5305-543-5059	55	H7903
5305-543-5059	55	H7922
5305-543-5059	56	H7925
5305-543-5059	56	H7926
5305-558-4888	53	H7908
5305-576-2273	41	H7100
5305-576-2273	41	H7101
5305-579-3021	44	H7941
5305-619-4409	41	H7102
5305-619-4409	41	H7103
5305-638-0653	42	H7408
5305-638-0653	42	H7608
5305-638-0653	44	H7940
5305-638-0653	51	H7513
5305-638-0653	51	H7708
5305-638-0653	51	H7817
5305-638-0653	54	H7901
5305-687-6535	54	H7912
5305-687-6535	54	H7932
5305-857-4335	51	H7942
5310-045-4007	55	H7905
5310-045-4007	55	H7924
5310-045-4007	56	H7929
5310-045-4007	56	H7930
5310-167-0815	51	H7514
5310-275-1292	40	H7209
5310-275-1292	40	H7230
5310-275-1292	47	H7209
5310-275-1292	47	H7212
5310-275-1292	47	H7230
5310-275-1292	47	H7240
5310-275-1292	49	H7206

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF. DESIGNATION
5310-275-1292	49	H7212
5310-275-1292	49	H7240
5310-275-1292	50	H7206
5310-543-2410	53	H7910
5310-543-2410	54	H7918
5310-543-2410	54	H7936
5310-543-2410	54	H7938
5310-543-2410	58	H7916
5310-543-2410	58	H7934
5310-543-4385	42	H7902
5310-543-5060	40	H7210
5310-543-5060	40	H7231
5310-543-5060	47	H7210
5310-543-5060	47	H7213
5310-543-5060	47	H7231
5310-543-5060	47	H7241
5310-543-5060	49	H7203
5310-543-5060	49	H7213
5310-543-5060	49	H7227
5310-543-5060	49	H7233
5310-543-5060	49	H7234
5310-543-5060	49	H7237
5310-543-5060	49	H7238
5310-543-5060	49	H7241
5310-543-5060	50	H7203
5310-543-5060	50	H7227
5310-543-5060	50	H7233
5310-543-5060	50	H7234
5310-543-5060	50	H7237
5310-543-5060	50	H7238
5310-616-3554	51	H7502
5310-616-3554	51	H7506
5310-616-3554	53	H7909
5310-616-3554	54	H7944
5310-616-3554	54	H7946
5310-616-3554	56	H7939
5310-616-3554	56	H7945
5310-734-5540	53	H7900
5310-934-9739	51	H7501
5310-934-9739	51	H7505
5320-119-6754	42	H7223
5320-119-6754	42	H7242
5330-530-0120	53	MP7915
5330-618-0799	53	MP7908
5340-984-9275	53	MP7902
5355-059-6285	42	MP7905
5905-060-2484	55	R7906
5905-258-8713	54	R7917
5905-279-4792	58	R7905
5905-284-2464	55	R7908
5905-577-9412	56	R7909
5905-615-6485	58	R7903
5905-681-3222	55	R7907
5905-702-1157	56	R7913
5905-765-5470	58	R7902
5905-814-0738	56	R7919
5905-818-5548	56	R7914
5905-849-0743	54	R7901
5905-959-0558	58	R7904
5905-989-5584	56	R7910
5905-995-4285	56	R7911
5910-891-9156	54	C7901
5920-280-4168	42	XF7901
5920-793-4653	40	F7000

INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF. DESIGNATION
5920-793-4653	40	F7001
5920-793-4653	40	F7002
5920-793-4653	40	F7003
5920-793-4653	40	F7004
5920-793-4653	42	F7901
5930-615-6330	51	S7901
5930-999-3814	54	S7902
5935-059-8664	41	J7100
5935-059-8752	54	J7903
5935-059-8752	54	J7904
5935-059-8752	54	J7905
5935-059-8752	54	J7906
5935-059-8752	54	J7907
5935-578-3489	42	TP7900A
5935-821-0920	54	J7902
5935-995-9264	41	P7100
5935-999-3817	41	P7101
5940-614-0537	54	E7907
5940-614-0537	54	E7909
5940-614-0537	56	E7906
5940-614-0537	56	E7908
5961-577-6084	54	CR7901
5961-893-5939	54	CR7902
5975-295-9325	53	MP7906
5975-548-6514	53	MP7900
6145-889-0615	41	W7001
6145-889-0645	41	W7000
6210-857-5322	42	XDS7901
6210-857-5323	42	XDS7902
6240-851-4352	41	DS7000
6240-851-4352	42	DS7901
6240-851-4352	42	DS7902
6625-059-8088	46	MP7500
6625-059-8088	48	MP7243
6625-059-9825	51	A7500
6625-069-9826	54	A7902
6625-329-2886	42	A7600
6625-329-2979	42	A7400
6625-329-3312	40	E7923
6625-329-3312	53	E7922
6625-329-3385	47	MP7213
6625-329-3385	49	MP7213
6625-345-8100	49	MP7219
6625-439-8762	40	CX7899/VRM-1
6625-443-5522	49	MP7208
6625-443-5523	40	MP7204
6625-443-5524	54	A7901
6625-443-9955	47	MP7204
6625-443-9957	50	MP7208
6625-810-5193	51	A7700
6625-810-5194	51	A7800
6625-857-5277	40	A7203
6625-857-5277	47	A7203
6625-857-5277	49	MP7218
6625-857-5277	50	MP7218
6625-857-5278	40	A7202
6625-857-5278	47	A7202
6625-857-5278	49	MP7212
6625-857-5278	50	MP7212
6625-857-5296	53	A7903
6625-889-0787	53	W7901
6625-930-2838	42	A7900

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
AN3054-6	88044	53	MP7906
AN3064-6	88044	53	MP7900
AN3066-6	88044	53	H7900
AN3067W3	88044	53	MP7915
AN507-440-3	88044	54	H7917
AN507-440-3	88044	54	H7919
AN507-440-3	88044	54	H7935
AN507-440-3	88044	54	H7937
AN960-2	88044	40	H7209
AN960-2	88044	40	H7230
AN960-2	88044	47	H7209
AN960-2	88044	47	H7212
AN960-2	88044	47	H7230
AN960-2	88044	47	H7240
AN960-2	88044	49	H7206
AN960-2	88044	49	H7212
AN960-2	88044	49	H7240
AN960-2	88044	50	H7206
AN960-4	88044	51	H7514
B3838-123	13467	48	MP7239
B3838-123	13467	48	MP7240
B3838-123	13467	48	MP7241
B3838-123	13467	48	MP7242
CC20J200G	81349	60	C7713
CC20UJ070C	81349	45	C7606
CC20UK010C	81349	45	C7611
CC200J100D	81349	60	C7715
CS13AD121K	81349	43	C7405
CS13AF470K	81349	43	C7403
CS13E150M	81349	43	C7401
CS13E150M	81349	43	C7402
CS13E150M	81349	43	C7404
C002LOF2200215	81349	41	W7001
COCMOF2160335	81349	41	W7000
C3838-118	13467	47	MP7219
D3838-115	13467	50	MP7208
D3838-125	13467	47	A7200
D3838-126	13467	47	MP7204
MC413542-27	80063	49	H7228
MC413542-27	80063	50	H7228
MPT06W8-4S	71468	41	P7100
MS20470AD2-3	96906	42	H7223
MS20470AD2-3	96906	42	H7242
MS28775-18	96906	53	MP7908
MS3114E8-4P	96906	54	J7902
MS35223-13	96906	43	H7908
MS35233-14	96906	42	H7408
MS35233-14	96906	42	H7608
MS35233-14	96906	44	H7940
MS35233-14	96906	51	H7513
MS35233-14	96906	51	H7708
MS35233-14	96906	51	H7817
MS35233-14	96906	54	H7901
MS35233-2	96906	49	H7202
MS35233-2	96906	49	H7226
MP35233-2	96906	50	H7202
MS35233-2	96906	50	H7226
MS35233-26	96906	44	H7941
MS35233-3	96906	40	H7208
MS35233-3	96906	40	H7229
MS35233-3	96906	47	H7208
MS35233-3	96906	47	H7211
MS35233-3	96906	47	H7229
MS35233-3	96906	47	H7239
MS35233-3	96906	49	H7205

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
MS35233-3	96906	49	H7211
MS35233-3	96906	49	H7239
MS35233-3	96906	50	H7205
MS35233-4	96906	49	H7215
MS35233-4	96906	49	H7216
MS35233-4	96906	49	H7235
MS35233-4	96906	49	H7236
MS35233-4	96906	50	H7215
MS35233-4	96906	50	H7216
MS35233-4	96906	50	H7235
MS35233-4	96906	50	H7236
MS35233-6	96906	43	H7402
MS35233-6	96906	43	H7406
MS35233-6	96906	45	H7602
MS35233-6	96906	45	H7606
MS35233-6	96906	52	H7509
MS35233-6	96906	52	H7510
MS35233-6	96906	59	H7805
MS35233-6	96906	59	H7811
MS35233-8	96906	59	H7802
MS35233-8	96906	59	H7810
MS35233-8	96906	60	H7702
MS35233-8	96906	60	H7706
MS35239-11	96906	54	H7912
MS35239-11	96906	54	H7932
MS35239-35	96906	41	H7100
MS35239-35	96906	41	H7101
MS35239-38	96906	41	H7102
MS35239-38	96906	41	H7103
MS35265-15	96906	58	H7915
MS35265-15	96906	58	H7933
MS35265-29	96906	55	H7903
MS35265-29	96906	55	H7922
MS35625-29	96906	56	H7925
MS35265-29	96906	56	H7926
MS35333-46	96906	42	H7902
MS35335-29	96906	51	H7502
MS35335-29	96906	51	H7506
MS35335-29	96906	53	H7909
MS35335-29	96906	54	H7944
MS35335-29	96906	54	H7946
MS35335-29	96906	56	H7939
MS35335-29	96906	56	H7945
MS35338-39	96906	40	H7210
MS35338-39	96906	40	H7231
MS35338-39	96906	47	H7210
MS35338-39	96906	47	H7213
MS35338-39	96906	47	H7231
MS35338-39	96906	47	H7241
MS35338-39	96906	49	H7203
MS35338-39	96906	49	H7213
MS35338-39	96906	49	H7227
MS35338-39	96906	49	H7233
MS35338-39	96906	49	H7234
MS35338-39	96906	49	H7237
MS35338-39	96906	49	H7238
MS35338-39	96906	49	H7241
MS35338-39	96906	50	H7203
MS35338-39	96906	50	H7227
MS35338-39	96906	50	H7233
MS35338-39	96906	50	H7234
MS35338-39	96906	50	H7237
MS35338-39	96906	50	H7238
MS35338-40	96906	53	H7910

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
MS35338-40	96906	54	H7918
MS35338-40	96906	54	H7920
MS35338-40	96906	54	H7936
MS35338-40	96906	54	H7938
MS35338-40	96906	58	H7916
MS35338-40	96906	58	H7934
MS35338-41	96906	55	H7905
MS35338-41	96906	55	H7924
MS35338-41	96906	56	H7929
MS35338-41	96906	56	H7930
MS35431-1	96906	54	E7907
MS35431-1	96906	54	E7909
MS35431-1	96906	56	E7906
MS35431-1	96906	56	E7908
MS35649-42	96906	51	H7501
MS35649-42	96906	51	H7505
MS90078-7-1	96906	40	F7000
MS90078-7-1	96906	40	F7001
MS90078-7-1	96906	40	F7002
MS90078-7-1	96906	40	F7003
MS90078-7-1	96906	40	F7004
MS90078-7-1	96906	42	F7901
RC07GF101K	81349	60	R7712
RC07GF102J	81349	54	R7921
RC07GF102J	81349	60	R7807
RC07GF103K	81349	43	R7401
RC07GF103K	81349	57	R7302
RC07GF103K	81349	60	R7715
RC07GF104K	81349	43	R7402
RC07GF104K	81349	60	R7805
RC07GF122J	81349	60	R7814
RC07GF150J	81349	60	R7811
RC07GF152K	81349	45	R7604
RC07GF152K	81349	60	R7713
RC07GF152K	81349	60	R7714
RC07GF153K	81349	43	R7410
RC07GF153K	81349	57	R7301
RC07GF182K	81349	45	R7605
RC07GF182J	81349	59	R7806
RC07GF220J	81349	54	R7918
RC07GF220J	81349	59	R7815
RC07GF221J	81349	59	R7802
RC07GF221J	81349	59	R7809
RC07GF221J	81349	59	R7812
RC07GF221K	81349	43	R7408
RC07GF221K	81349	60	R7701
RC07GF221K	81349	60	R7703
RC07GF224K	81349	43	R7403
RC07GF271J	81349	57	R7304
RC07GF272J	81349	59	R7813
RC07GF272K	81349	60	R7704
RC07GF332K	81349	43	R7404
RC07GF332K	81349	43	R7407
RC07GF332K	81349	60	R7710
RC07GF332K	81349	60	R7711
RC07GF332K	81349	60	R7717
RC07GF390K	81349	45	R7608
RC07GF392J	81349	45	R7606
RC07GF392J	81349	45	R7607
RC07GF392K	81349	60	R7706
RC07GF470K	81349	60	R7702
RC07GF471J	81349	57	R7303
RC07GF471J	81349	59	R7808
RC07GF472K	81349	43	R7405

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
RC07GF472K	81349	45	R7602
RC07GF472K	81349	45	R7603
RC07GF472K	81349	45	R7609
RC07GF472K	81349	59	R7804
RC07GF472K	81349	60	R7705
RC07GF510J	81349	45	R7612
RC07GF510J	81349	45	R7613
RC07GF510J	81349	59	R7818
RC07GF562K	81349	60	R7707
RC07GF562K	81349	60	R7709
RC07GF682K	81349	43	R7409
RC07GF682K	81349	60	R7716
RC07GF822J	81349	59	R7819
RC07GF822K	81349	45	R7601
RE65H24R9	81349	54	R7901
RN65D1002F	81349	58	R7905
RN5D1053F	81349	58	R7903
RN65D1101F	81349	55	R7907
RN65D1301F	81349	54	R7917
RN65D1301F	81349	54	R7920
RN65D2433F	81349	56	R7909
RN65D2612F	81349	55	R7906
RN65D4020F	81349	56	R7914
RN65D4750F	81349	55	R7908
RN65D5113F	81349	58	R7904
RN65D5231F	81349	56	R7919
RN65D66R5F	81349	56	R7913
RN65D84R5F	81349	56	R7911
RN65D8450F	81349	56	R7910
RN65D8451F	81349	58	R7902
SCA21825-5	80063	41	MP7100
SMB413738	80063	45	L7601
SMB413738	80063	45	L7602
SMB413738	80063	60	L7702
SMB413738	80063	60	L7703
SMB413797	80063	43	E7400
SMB413797	80063	43	E7401
SMB415142-3	80063	53	MP7902
SMB416106	80063	40	E7923
SMB416106	80063	53	E7922
SMB416109	80063	43	H7403
SMB416109-1	80063	43	H7400
SMB416109-1	80063	43	H7404
SMB416109-1	80063	45	H7600
SMB416109-1	80063	45	H7604
SMB416109-1	80063	52	H7500
SMB416109-1	80063	52	H7504
SMB416109-1	80063	59	H7800
SMB416109-1	80063	59	H7807
SMB416109-1	80063	60	H7700
SMB416109-1	80063	60	H7704
SMB416109-2	80063	49	MP7224
SMB416109-2	80063	49	MP7225
SMB416109-2	80063	50	MP7224
SMB416109-2	80063	50	MP7225
SMB416109-2	80063	51	H7943
SMB416109-2	80063	55	H7904
SMB416109-2	80063	55	H7923
SMB416109-2	80063	56	H7927
SMB416109-2	80063	56	H7928
SMB416109-3	80063	43	H7407
SMB416109-3	80063	45	H7603
SMB416109-3	80063	45	H7607
SMB416109-3	80063	52	H7511

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
SMB416109-3	80063	52	H7512
SMB416109-3	80063	59	H7803
SMB416109-3	80063	59	H7806
SMB416109-3	80063	59	H7812
SMB416109-3	80063	59	H7816
SMB416109-3	80063	60	H7703
SMB416109-3	80063	60	H7707
SMB416127	80063	49	MP7221
SMB416127	80063	49	MP7222
SMB416127	80063	50	MP7221
SMB416127	80063	50	MP7222
SMB416128	80063	49	MP7207
SMB416128	80063	50	MP7207
SMB416129	80063	49	MP7205
SMB416129	80063	50	MP7205
SMB416130	80063	49	MP7223
SMB416130	80063	50	MP7223
SMB416131	80063	49	MP7209
SMB416131	80063	50	MP7209
SMB416143-1	80063	49	MP7210
SMB416143-1	80063	49	MP7211
SMB416143-1	80063	50	MP7210
SMB416143-1	80063	50	MP7211
SMB416147-1	80063	49	MP7216
SMB416147-1	80063	49	MP7217
SMB416147-1	80063	50	MP7216
SMB416147-1	80063	50	MP7217
SMB416149	80063	47	MP7214
SMB416149	80063	47	MP7215
SMB416149	80063	49	MP7214
SMB416149	80063	49	MP7215
SMB416156	80063	46	MP7200
SMB416156	80063	46	MP7201
SMB416156	80063	46	MP7202
SMB416156	80063	46	MP7203
SMB416158-1	80063	60	Q7701
SMB416158-2	80063	44	R7708
SMB416158-2	80063	44	R7718
SMB416158-3	80063	44	C7708
SMB416170-1	80063	44	R7501
SMB416175-1	80063	45	Q7602
SMB416175-2	80063	44	R7611
SMB416189	80063		MP7000
SMB416198	80063	53	MP7909
SMB416199	80063	53	MP7914
SMB416201	80063	51	H7942
SMB416202	80063	53	MP7910
SMB416208	80063	51	H7913
SMB416210-1	80063	53	E7921
SMB416211	80063	53	MP7911
SMB416213	80063	53	E7920
SMB416215	80063	53	W7304
SMB416215-2	80063	57	L7301
SMB416219	80063	49	MP7206
SMB416219	80063	50	MP7206
SMB416220-4	80063	54	E7901
SMB416220-4	80063	54	E7902
SMB416220-4	80063	54	E7910
SMB416220-4	80063	54	E7911
SMB416220-4	80063	58	E7903
SMB416220-4	80063	58	E7912
SMB416220-5	80063	42	H7907
SMB416220-7	80063	51	H7914
SMB416295-1	80063	49	E7200
SMB416295-1	80063	50	E7200

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
SMC413525-6	80063	43	H7401
SMC413525-6	80063	43	H7405
SMC413525-6	80063	45	H7601
SMC413525-6	80063	45	H7605
SMC413525-6	80063	49	H7204
SMC413525-6	80063	50	H7204
SMC413525-6	80063	52	H7507
SMC413525-6	80063	52	H7508
SMC413525-6	80063	54	H7911
SMC413525-6	80063	54	H7931
SMC413525-6	80063	59	H7801
SMC413525-6	80063	59	H7804
SMC413525-6	80063	59	H7808
SMC413525-6	80063	9	H7809
SMC413525-6	80063	60	H7701
SMC413525-6	80063	60	H7705
SMC413542-27	80063	49	H7207
SMC413542-27	80063	49	H7214
SMC413542-27	80063	49	H7232
SMC413542-27	80063	50	H7207
SMC413542-27	80063	50	H7214
SMC413542-27	80063	50	H7232
SMC413567-1	80063	60	C7705
SMC413567-1	80063	60	C7706
SMC413567-1	80063	60	C7707
SMC413567-1	80063	60	C7709
SMC413567-1	80063	60	C7710
SMC413567-1	80063	60	C7711
SMC413567-1	80063	60	C7712
SMC413567-1	80063	60	C7716
SMC413567-3	80063	57	C7301
SMC413567-3	80063	57	C7302
SMC413567-3	80063	57	C7303
SMC413567-4	80063	45	C7601
SMC413567-4	80063	45	C7603
SMC413567-4	80063	45	C7604
SMC413567-4	80063	45	C7605
SMC413567-4	80063	45	C7607
SMC413567-4	80063	45	C7609
SMC413567-4	80063	45	C7610
SMC413567-4	80063	54	C7901
SMC413567-4	80063	60	C7701
SMC413567-4	80063	60	C7702
SMC413567-4	80063	60	C7703
SMC413567-7	80063	54	C7902
SMC413577	80063	52	L7501
SMC413577	80063	60	L7701
SMC413735	80063	45	T7602
SMC413740	80063	45	T7601
SMC413795	80063	43	L7401
SMC413798	80063	43	E7402
SMC413798	80063	59	E7800
SMC413798	80063	59	E7801
SMC413798	80063	59	E7802
SMC413798	80063	59	E7803
SMC413798	80063	59	E7804
SMC413798	80063	59	E7805
SMC413798	80063	60	E7700
SMC413843-3	80063	54	C7903
SMC416107	80063	42	MP7226
SMC416125	80063	49	MP7219
SMC416126-2	80063	49	E7201
SMC416126-2	80063	50	E7201
SMC416128	80063	49	MP7220

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
SMC416128	80063	50	MP7220
SMC416142	80063	40	A7202
SMC416142	80063	47	A7202
SMC416145	80063	47	MP7213
SMC416145	80063	49	MP7213
SMC416146	80063	40	A7203
SMC416146	80063	47	A7203
SMC416153	80063	57	E7300
SMC416153	80063	59	E7806
SMC416153	80063	60	E7701
SMC416161	80063	46	MP7500
SMC416161	80063	48	MP7243
SMC416163	80063	60	L7704
SMC416165	80063	60	T7702
SMC416167	80063	60	L7705
SMC416177	80063	45	TB7600
SMC416180	80063	54	A7901
SMC416182	80063	45	L7603
SMB416185-1	80063	44	R7406
SMC416190	80063	41	MP7101
SMC416193	80063	41	MP7102
SMC416205	80063	53	MP7913
SMC416209	80063	53	W7901
SMC416212	80063	53	MP7912
SMC416216	80063	57	TB7300
SMC416221	80063	42	XF7901
SMC416223	80063	55	MP7903
SMC416223	80063	56	MP7904
SMC416224	80063	51	S7901
SMC416250	80063	54	MP7901
SMC416256	80063	44	MD7227
SMC416262	80063	41	P7101

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
SMC416268	80063	54	TB7900
SMD413568-14	80063	45	C7613
SMD413568-14	80063	57	C7304
SMD413568-14	80063	60	C7714
SMD413568-22	80063	45	C7608
SMD413568-25	80063	45	C7602
SMD413568-26	80063	60	C7704
SMD413568-27	80063	45	C7612
SMD413707-2	80063	59	C7801
SMD413707-2	80063	59	C7802
SMD413707-6	80063	52	C7501
SMD413796	80063	43	Q7402
SMD413796	80063	43	Q7403
SMD416104	80063	40	TS1777/VRM-1
SMD416110	80063	40	MP7204
SMD416123	80063	40	A7200
SMD416132	80063	49	MP7208
SMD416144	80063	49	MP7212
SMD416144	80063	50	MP7212
SMD416148	80063	49	MP7218
SMD416148	80063	50	MP7218
SMD416150	80063	51	A7800
SMD416152	80063	59	TB7800
SMD416155	80063	43	P7401
SMD416155	80063	45	P7601
SMD416155	80063	52	P7501
SMD416155	80063	59	P7801
SMD416155	80063	60	P7701
SMD416157	80063	51	A7700
SMD416159	80063	60	TB7700
SMD416162	80063	45	CR7602
SMD416162	80063	60	CR7701

SECTION III INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
SMD416162	80063	60	CR7702
SMD416169	80063	51	A7500
SMD416171	80063	51	TB7500
SMD416173	80063	52	FL7501
SMD416174	80063	42	A7600
SMD416184	80063	42	A7400
SMD416186	80063	43	TB7400
SMD416188	80063	40	CX7899/VRM-1
SMD416192	80063	41	J7100
SMD416196	80063	53	A7903
SMD416214	80063	53	A7904
SMD416219	80063	42	A7900
SMD416222	80063	42	MP7905
SMD416225	80063	54	J7903
SMD416225	80063	54	J7904
SMD416225	80063	54	J7905
SMD416225	80063	54	J7906
SMD416225	80063	54	J7907
SMD416226	80063	54	MP7907
SMD416253	80063	54	A7902
SMD416255	80063	54	S7902
SMD416264	80063	54	W7900
1N270	81349	43	CR7404
1N270	81349	45	CR7601
1N2980B	81349	54	CR7902
1N645	81349	43	CR7401
1N645	81349	43	CR7402
1N645	81349	43	CR7403
1N645	81349	54	CR7901
1N645	81349	59	CR7801
1N645	81349	59	CR7802

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF. DESIGNATION
REFERENCE NO.	MFG. CODE	FIG. NO.	REFERENCE DESIGNATION
105602	74970	42	TP7900A
1778430XP10971	72619	42	XDS7901
1778430XP10972	72619	42	XDS7902
2N335	81349	43	Q7401
2N491	81349	59	Q7801
2N491	81349	59	Q7806
2N502B	81349	45	Q7601
2N502B	81349	60	Q7702
2N697	81349	59	Q7802
2N697	81349	59	Q7803
2N697	81349	59	Q7804
2N697	81349	59	Q7805
2N706	81349	57	Q7301
2N706	81349	60	Q7703
2N887	81349	59	CR7803
220W526502	80294	44	R7801
220W526502	80249	44	R7803
220W526502	80249	44	R7816
330	81349	40	DS7000
330	81349	42	DS7901
330	81349	42	DS7902

REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER
A7200	9	C7610	7	CR7702	23
A7202	10	C7611	7	CR7801	21
A7203	11	C7612	7	CR7802	21
A7400	5	C7613	7	CR7803	21
A7500	13	C7701	21	CR7901	17
A7600	7	C7702	21	CR7902	17
A7700	21	C7703	21	CX7899/VRM-1	5
A7800	19	C7704	21	DS7000	5
A7900	14	C7705	21	DS7901	15
A7901	14	C7706	21	DS7902	15
A7902	18	C7707	21	E7200	10
A7903	16	C7708	22	E7201	10
A7904	16	C7709	21	E7300	16
C7301	16	C7710	21	E7400	6
C7302	16	C7711	21	E7401	6
C7303	16	C7712	21	E7402	6
C7304	16	C7713	22	E7700	22
C7401	5	C7714	21	E7701	22
C7402	5	C7715	22	E7800	19
C7403	6	C7716	21	E7801	19
C7404	6	C7801	19	E7802	19
C7405	5	C7802	19	E7803	19
C7501	13	C7901	14	E7804	19
C7601	7	C7902	14	E7805	19
C7602	7	C7903	14	E7806	19
C7603	7	CR7401	6	E7901	17
C7604	7	CR7402	7	E7902	17
C7605	7	CR7403	7	E7903	17
C7606	7	CR7404	7	E7906	19
C7607	7	CR7601	8	E7907	19
C7608	7	CR7602	8	E7908	19
C7609	7	CR7701	23	E7909	19

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E7910	17	H7215	12	H7504	13
E7911	17	H7216	12	H7505	13
E7912	17	H7223	19	H7506	14
E7920	16	H7226	9	H7507	14
E7921	16	H7227	9	H7508	14
E7922	17	H7228	10	H7509	14
E7923	17	H7229	11	H7510	14
F7000	5	H7230	11	H7511	14
F7001	5	H7231	11	H7512	14
F7002	5	H7232	12	H7513	13
F7003	5	H7233	12	H7514	13
F7004	5	H7234	12	H7600	7
F7901	15	H7235	13	H7601	8
FL7501	13	H7236	13	H7602	8
H7100	5	H7237	13	H7603	8
H7101	5	H7238	13	H7604	7
H7102	5	H7239	11	H7605	8
H7103	5	H7240	11	H7606	8
H7202	9	H7241	12	H7607	8
H7203	9	H7242	19	H7608	7
H7204	9	H7400	6	H7700	22
H7205	10	H7401	6	H7701	22
H7206	10	H7402	6	H7702	22
H7207	10	H7403	6	H7703	22
H7208	10	H7404	6	H7704	22
H7208	11	H7405	6	H7705	22
H7209	11	H7406	6	H7706	22
H721C	11	H7407	6	H7707	22
H7211	11	H7408	5	H7708	21
H7212	11	H750C	13	H7800	19
H7213	11	H7501	13	H7801	20
H7214	12	H7502	13	H7802	20

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CROSS REFERENCE TO PAGE NUMBER (CONTINUED)

REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER
H7803	20	H7922	15	L7301	16
H7804	20	H7923	15	L7401	6
H7805	20	H7924	15	L7501	13
H7806	20	H7925	15	L7601	7
H7807	19	H7926	15	L7602	7
H7806	20	H7927	15	L7603	7
H7809	20	H7928	15	L7701	22
H7810	20	H7929	15	L7702	22
H7811	20	H7930	15	L7703	22
H7812	20	H7931	17	L7704	22
H7816	20	H7932	17	L7705	22
H7817	19	H7933	17	MP7000	5
H7900	14	H7934	17	MP7100	5
H7901	14	H7935	17	MP7101	5
H7902	15	H7936	17	MP7102	5
H7903	15	H7937	18	KP7200	8
H7904	15	H7938	18	MP7201	6
H7905	15	H7939	19	MP7202	9
H7907	15	H7940	14	MP7203	9
H7908	16	H7941	14	MP7204	9
H7909	16	H7942	14	MP7205	9
H7910	16	H7943	14	MP7206	9
H7911	17	H7944	19	MP7207	9
H7912	17	H7945	19	MP7208	10
H7913	17	H7946	19	MP7209	10
H7914	17	J71O0	5	MP7210	10
H7915	17	J7902	18	MP7211	10
H7916	17	J7903	18	MP7212	10
H7917	17	J7904	18	MP7213	10
H7918	17	J7905	16	MP7214	11
H7919	18	J7906	18	MP7215	11
H7920	18	J7907	18	MP7216	12

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CROSS REFERENCE TO PAGE NUMBER (CONTINUED)

REFERENCE DESIGNATION	PAGE NUMBER
MP7217	12
MP7218	12
MP7219	12
MP7220	12
MP7221	12
MP7222	12
MP7222	13
MP7223	13
MP7224	13
MP7225	13
AP7226	19
MP7227	19
MP7239	9
MP7240	9
MP7241	9
MP7242	99
MP7243	9
MP7500	14
MP7900	14
MP7901	14
MP7902	15
MP7903	15
MP7904	15
MP7905	15
MP7906	15
MP7907	15
MP7906	16
MP7909	16
MP7910	16
MP7911	16
MP7912	16
MP7913	16
MP7914	17
MP7915	18
P71OO	5
P7101	5
P7401	6
P7501	13
P7601	7
P7701	22
P7801	19
Q7301	16
C7401	7
Q7402	7
Q7403	7
Q7601	8
Q7602	8
Q7701	23
Q7702	23
Q7703	23
Q7801	21
Q7802	21
Q7803	21
Q7804	21
Q7805	21
Q7806	21
R7301	16
R7302	16
R7303	16
R7304	16
R7401	6
R7402	6
R7403	6
R7404	6
R7405	6
R7406	6
R7407	6
R7408	6
R7409	6
R7410	6
R7501	14
R7601	8
R7602	8
R7603	8
R7604	8
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R7612	8
R7613	8
R7701	22
R7702	23
R7703	[illegible]
R7704	23
R7705	23
R7706	23
R7707	23
R7708	23
R7709	22
R7710	23
R7711	23
R7712	23
R7713	22
R7714	22
	22

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CROSS REFERENCE TO PAGE NUMBER (CONTINUED)

REFERENCE DESIGNATIUN	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE
R7715	22	R7913	18		
R7716	23	R7914	18		
R7717	23	R7917	17		
R7718	22	R7918	14		
R7801	20	R7919	“18		
R7802	20	R7920	14		
R7803	20	R7921	14		
R7804	21	S7901	17		
R7805	20	S7902	19		
R7806	20	T7601	8		
R7807	20	T7602	8		
R7808	20	T7702	23		
R7809	20	TB7300	16		
R7811	20	TB7400	6		
R7812	20	TB7500	14		
R7813	20	TB7600	8		
R7814	20	TB7700	22		
R7815	20	TB7800	20		
R7816	20	TB7900	14		
R7818	21	TP7900A	15		
R7819	21	TS1777/VRM-1	5		
R7901	17	W7000	5		
R7902	18	W7001	5		
R7903	1.8	W7304	16		
R7904	18	W7900	18		
R7905	18	W7901	16		
R7906	18	XDS7901	15		
R7907	18	XDS7902	15		
R7908	18	XF7901	15		
R7909	18				
R7910	18				
R7911	18				

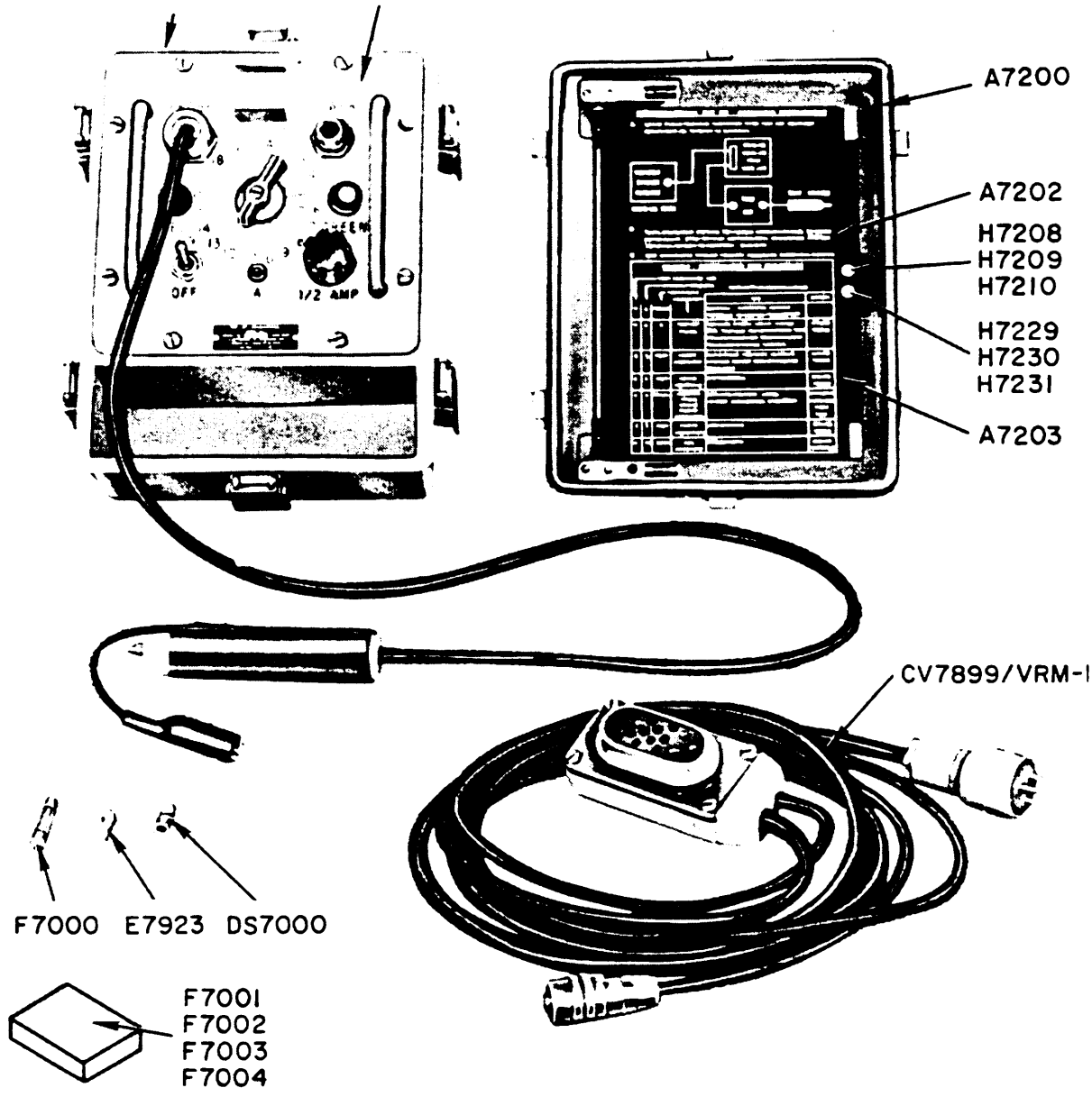


Figure 40. Test Set, Radio AN/VRM-1, components and running spares.

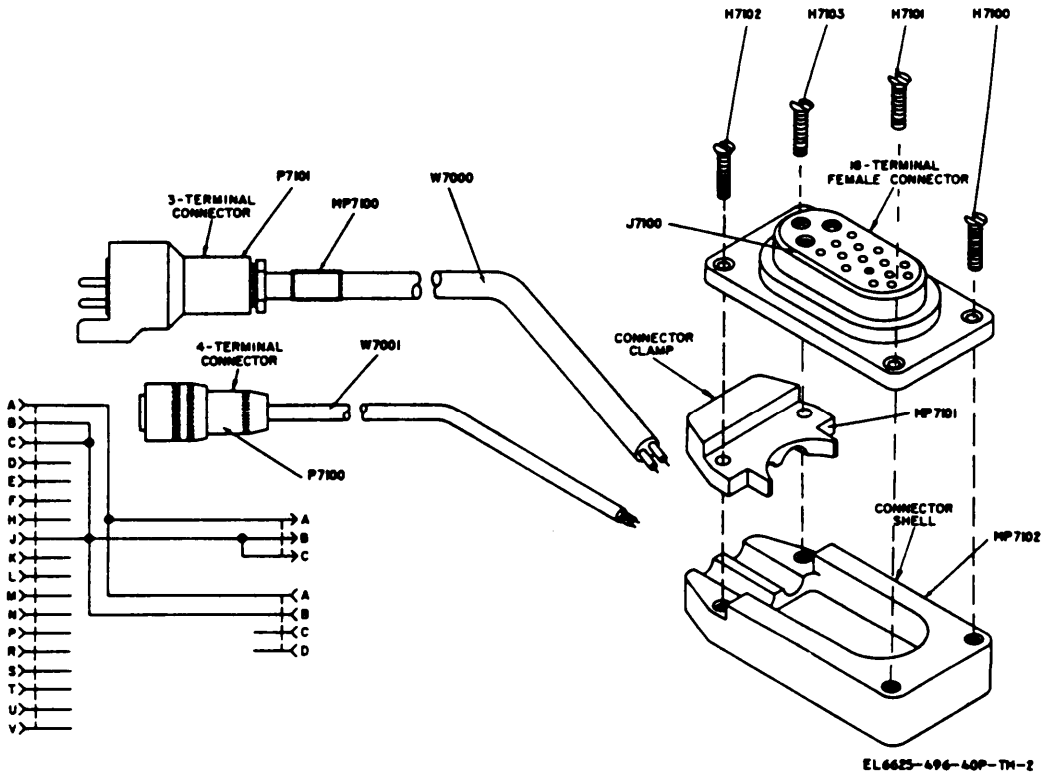


Figure 41. Branched power cable, partially disassembled.

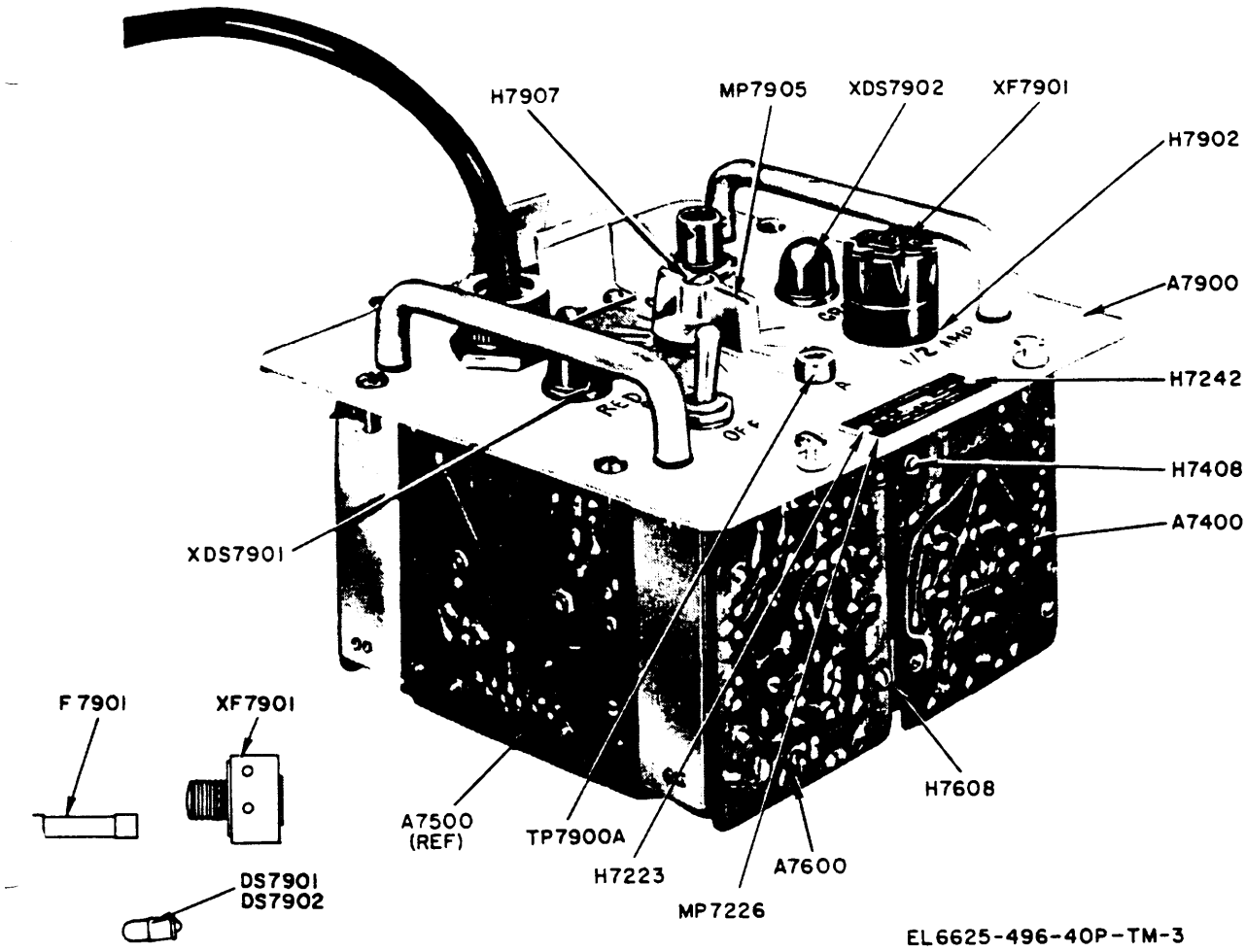


Figure 42. Test set, case removed, three-quarter view from bottom

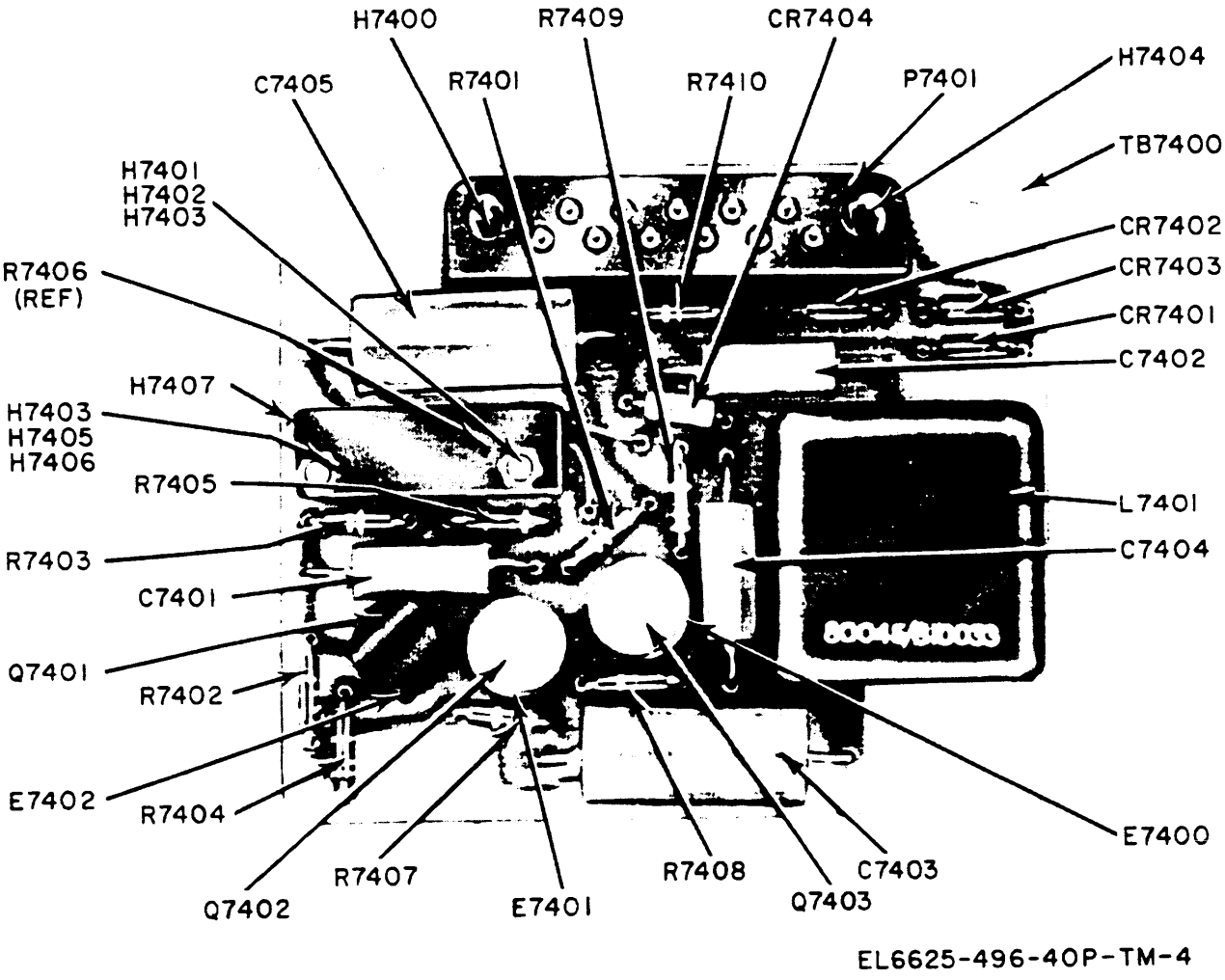


Figure 43. Audiofrequency amplifier printed circuit card A7400.

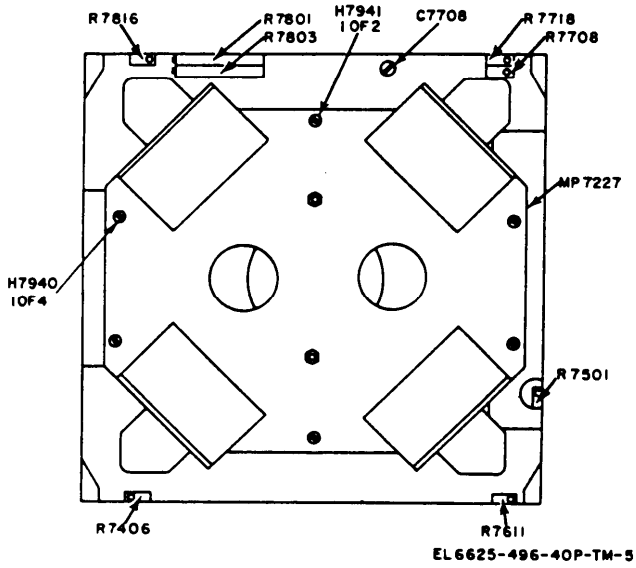


Figure 44. Teat set, case removed, adjustable components, rear view.

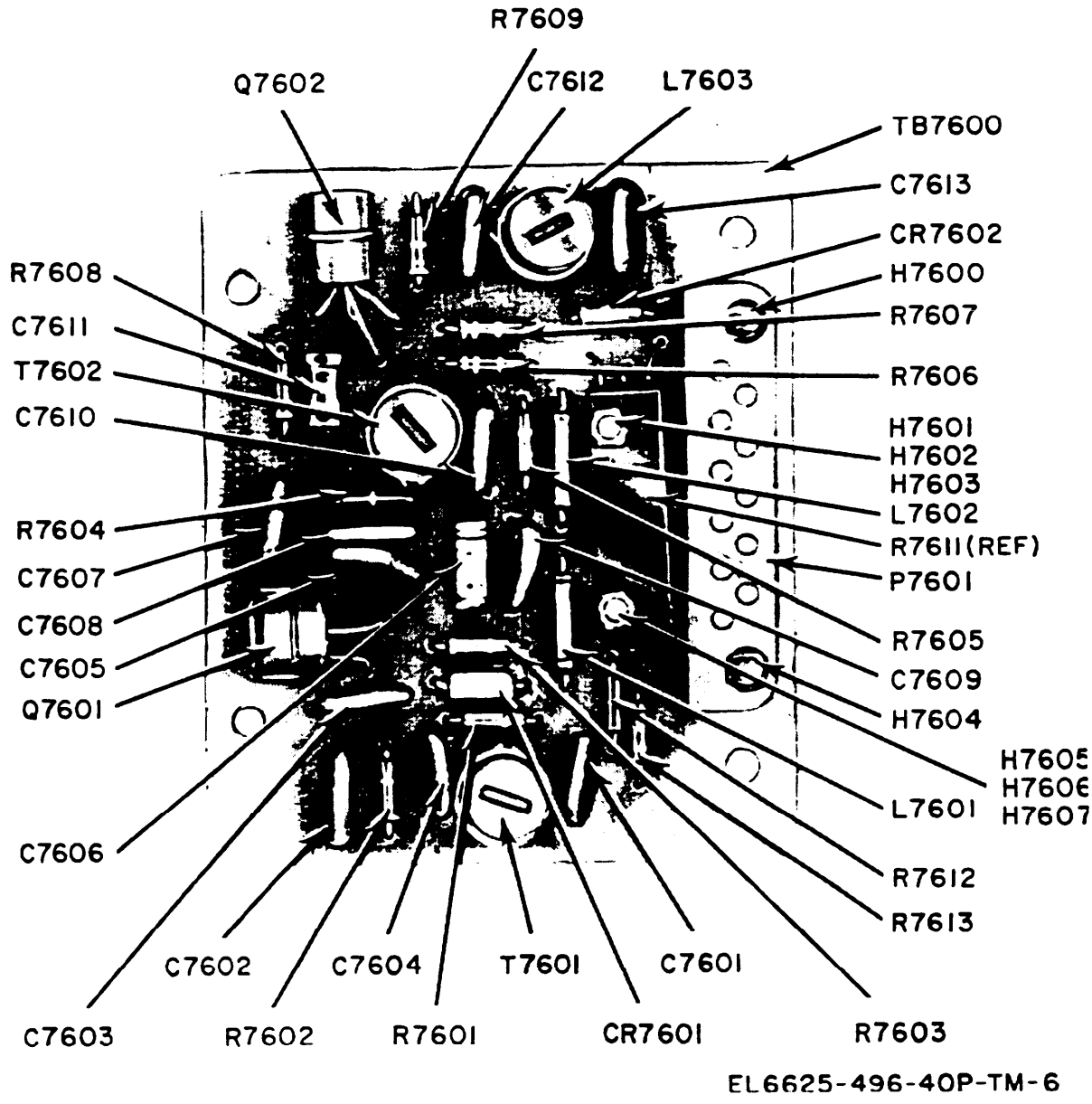


Figure 45. 11.5-MHz amplifier printed circuit card A7600.

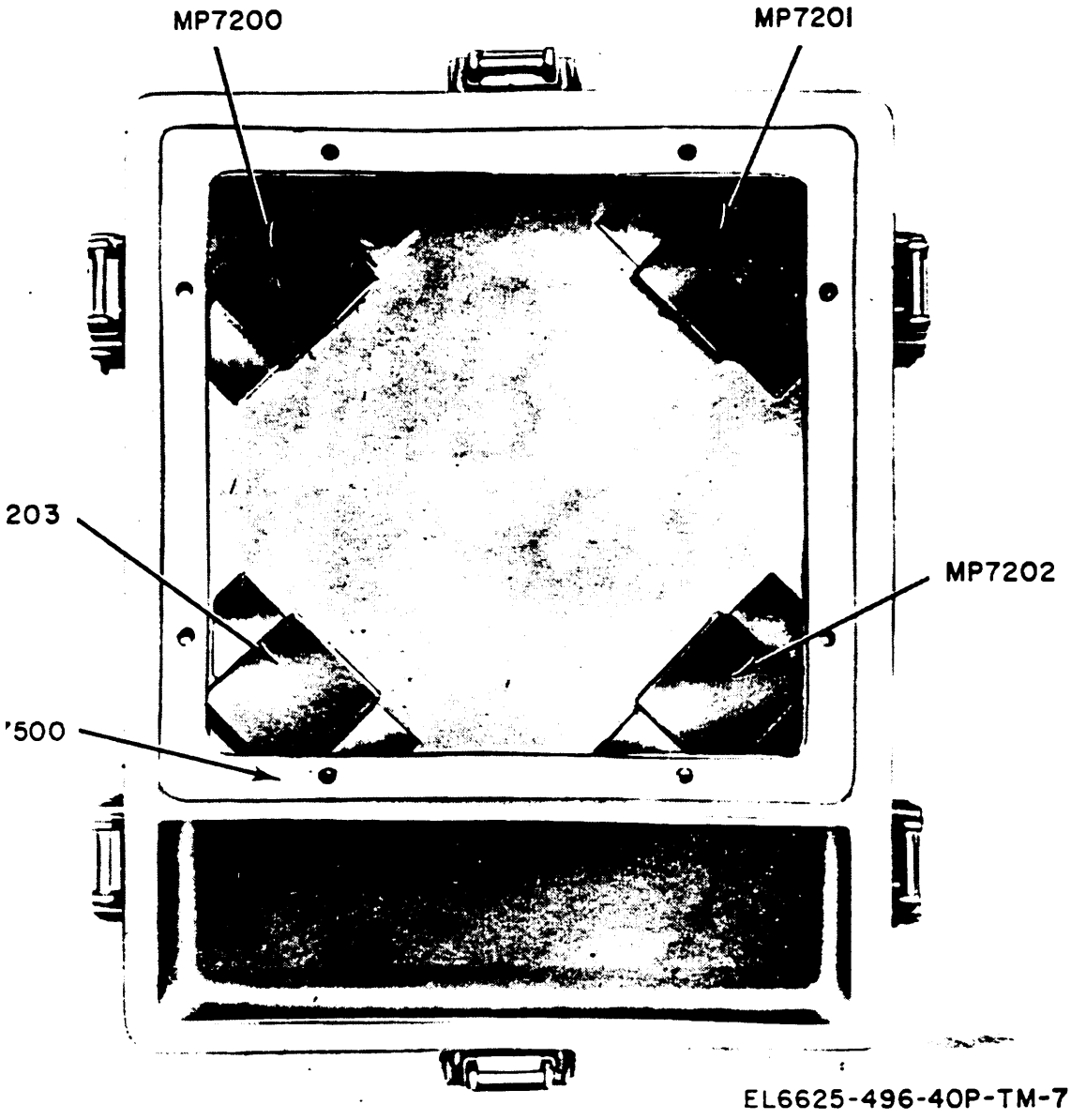


Figure 46. Case, test set removed, gaaket and bumpers (AN/VRM-1).

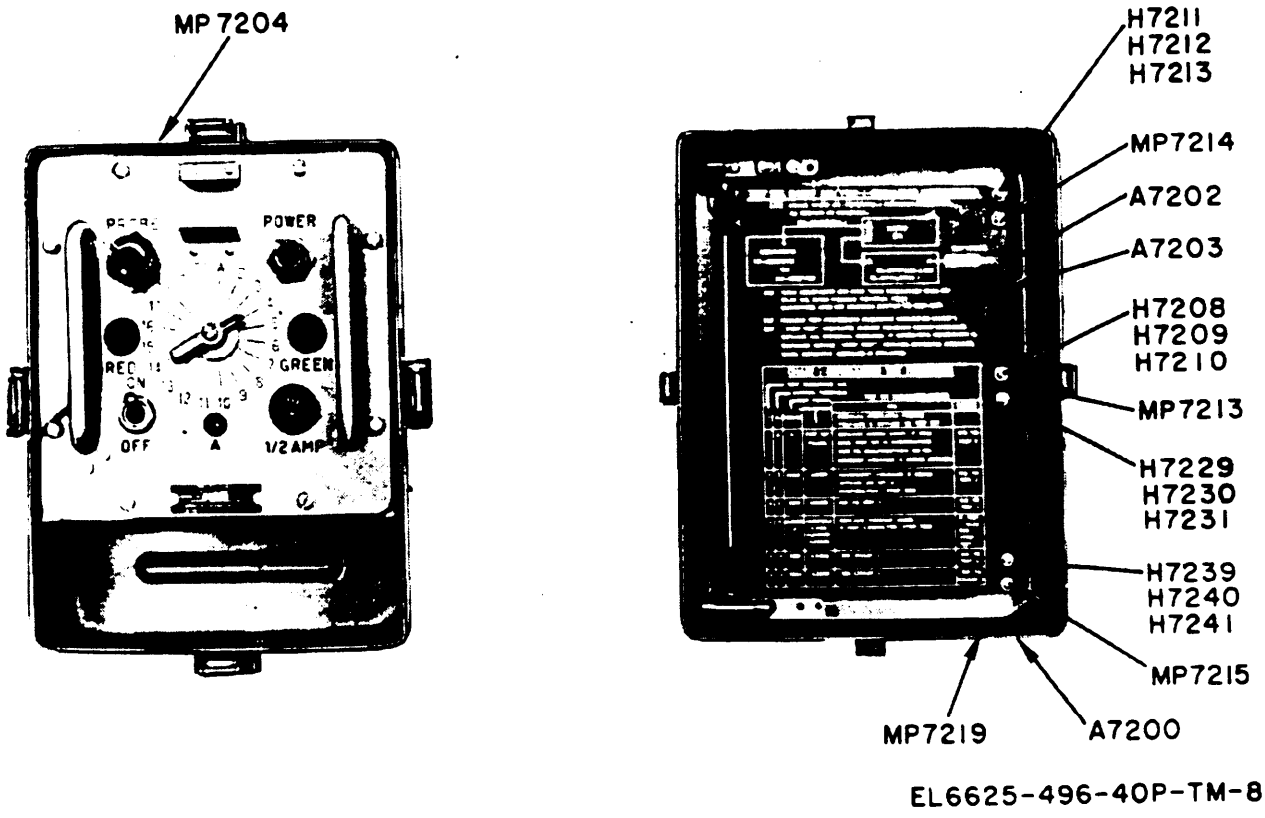


Figure 47. Test Set, Radio AN/VRM-1A, case cover and instruction plates.

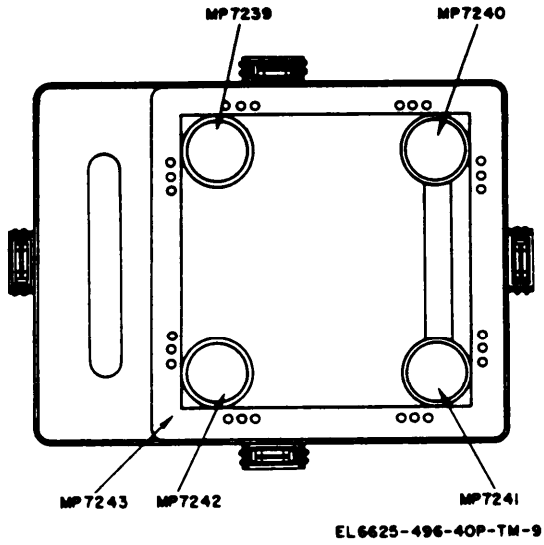


Figure 48. Case, test set removed, gasket and (AN/VRM-1A)

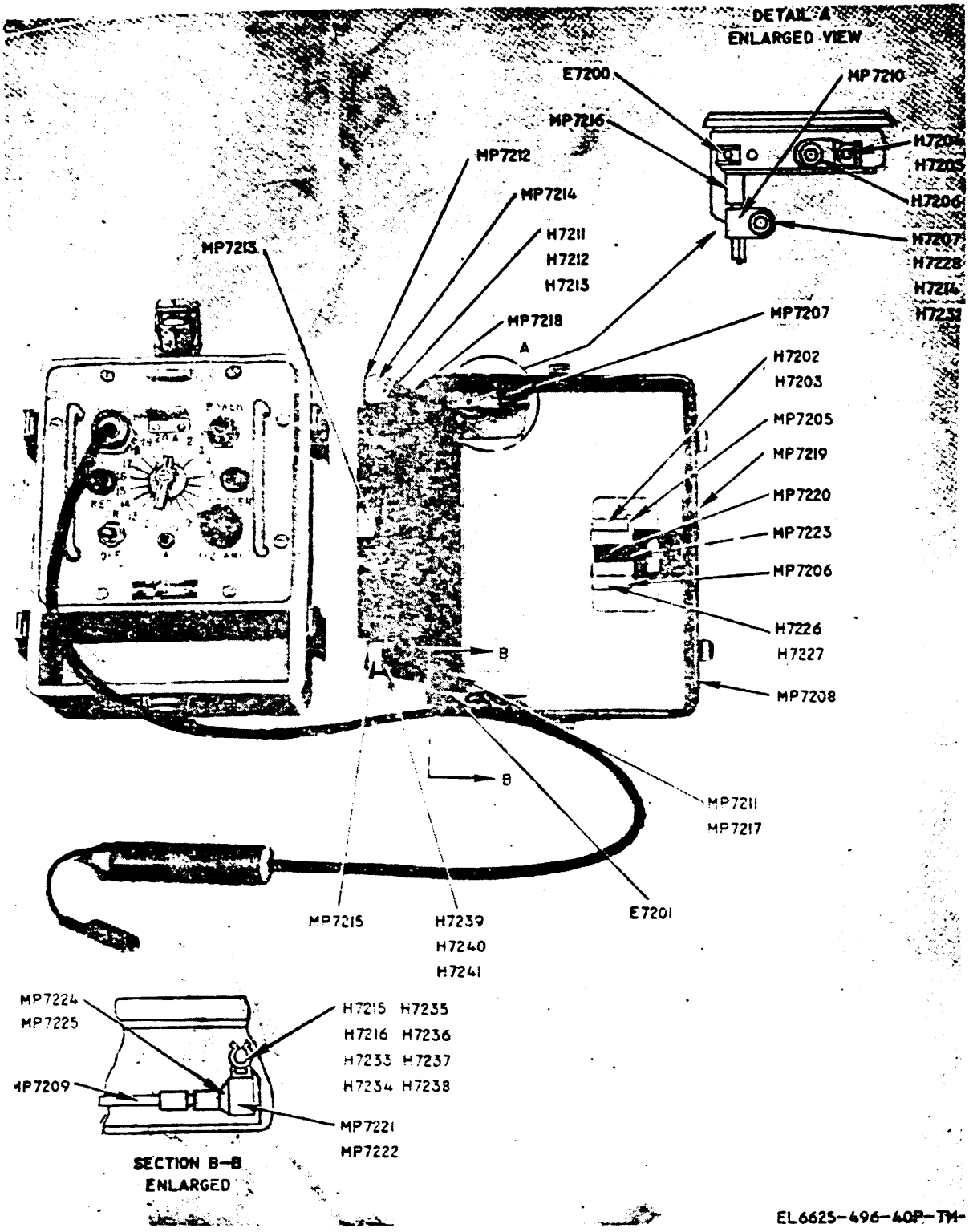


Figure 49. Test Set, Radio AN/VRM-1, cover components.

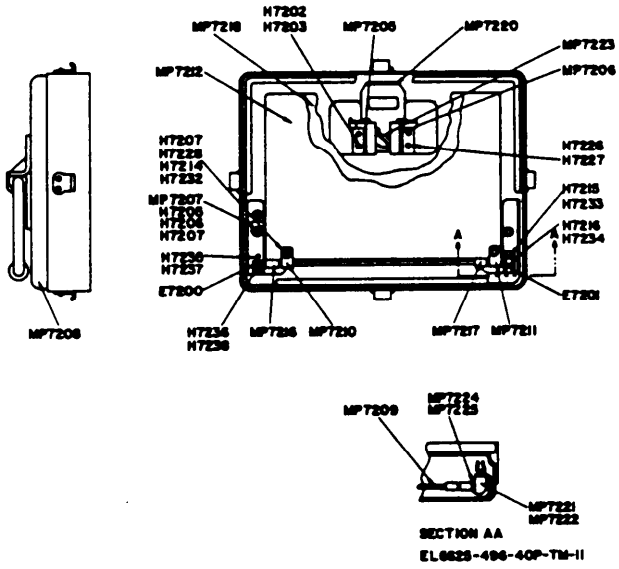


Figure 50. Cover assembly (AN/VRM-1A).

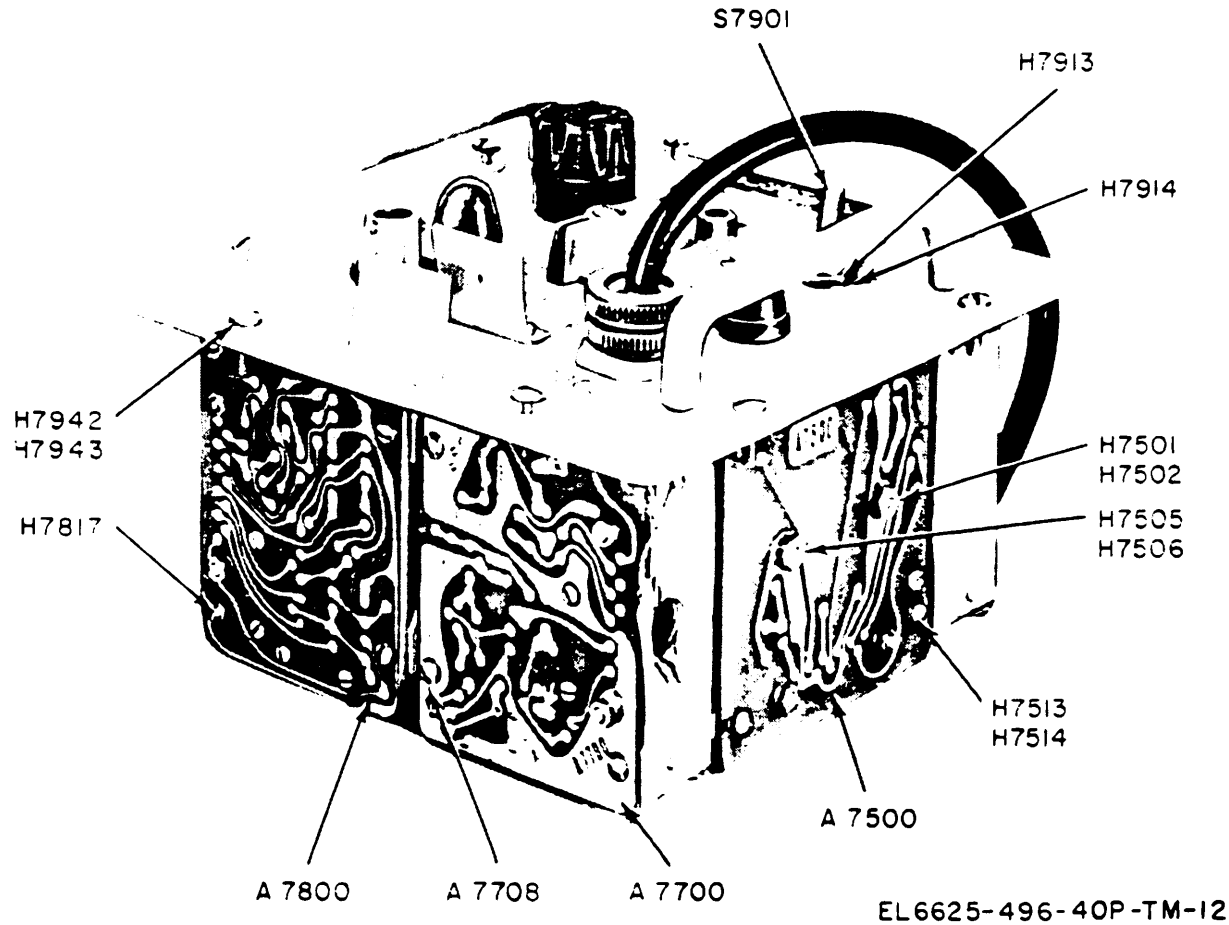


Figure 51. Ted set, case removed, three-quarter view from top.

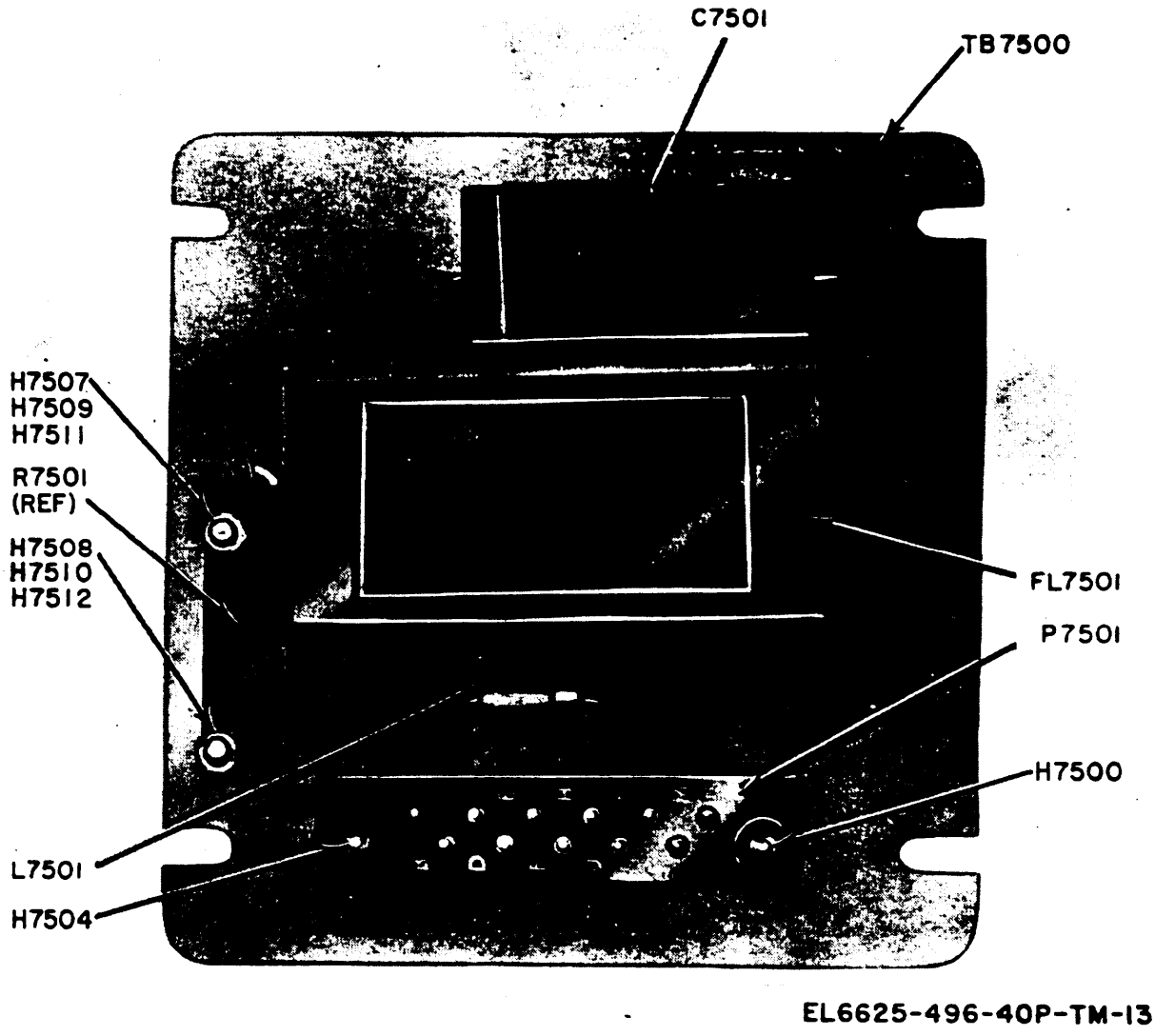


Figure 52. Band pass filter printed circuit card A7500.

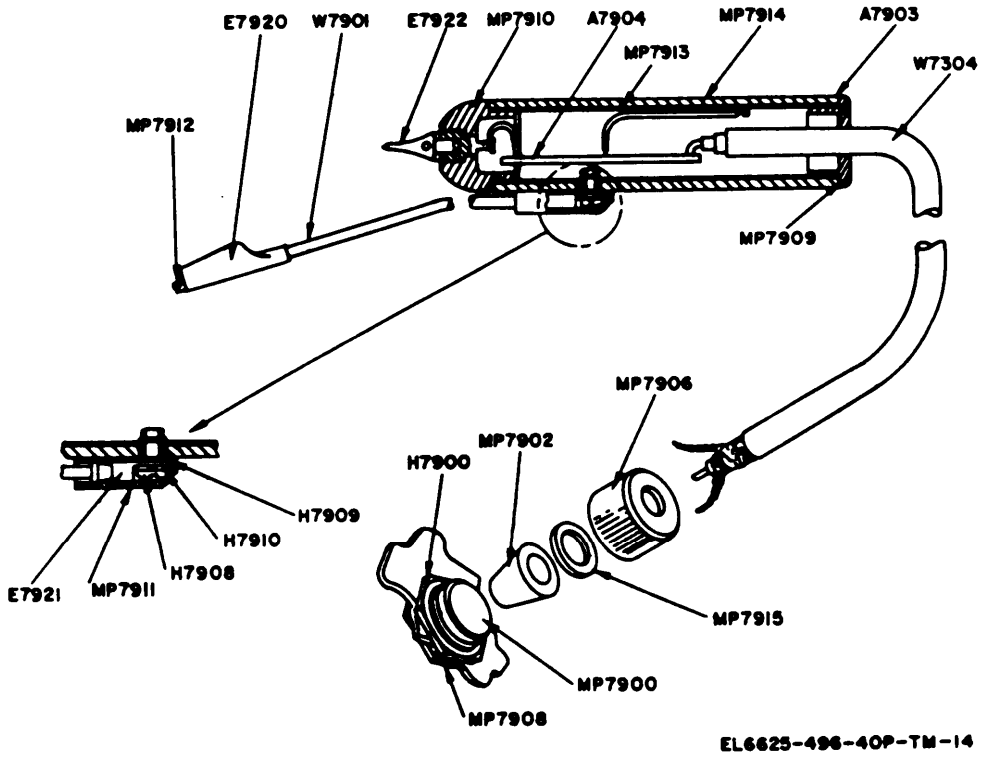
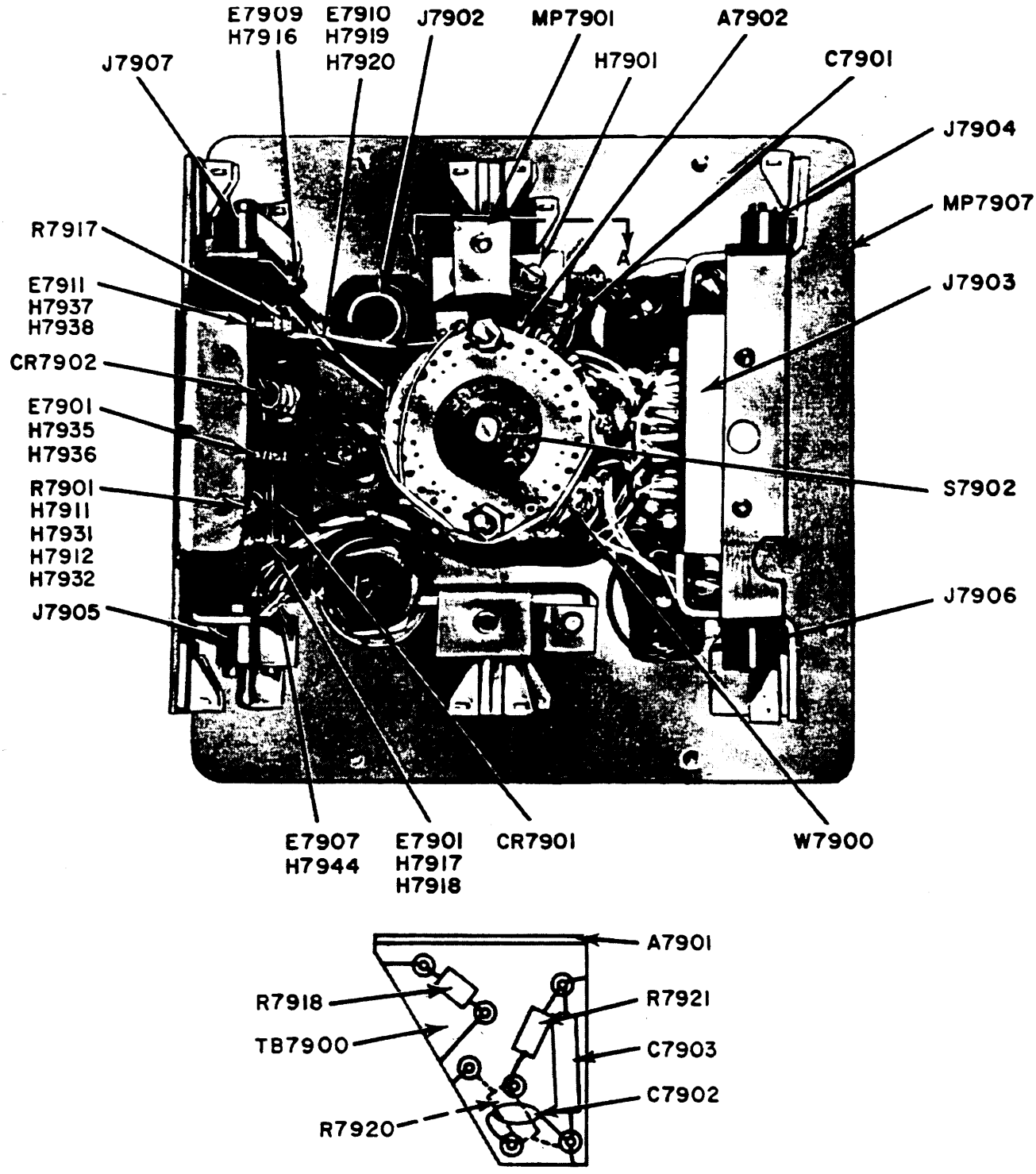


Figure 53. Test probe assembly.



TEST SET SUB-ASSEMBLY

(CAPACITOR- RESISTOR ASSEMBLY)

SECTION A-A

EL6625-496-40P-TM-15

Figure 54. Test set, front panel and chassis, chassis bottom plate removed, rear view.

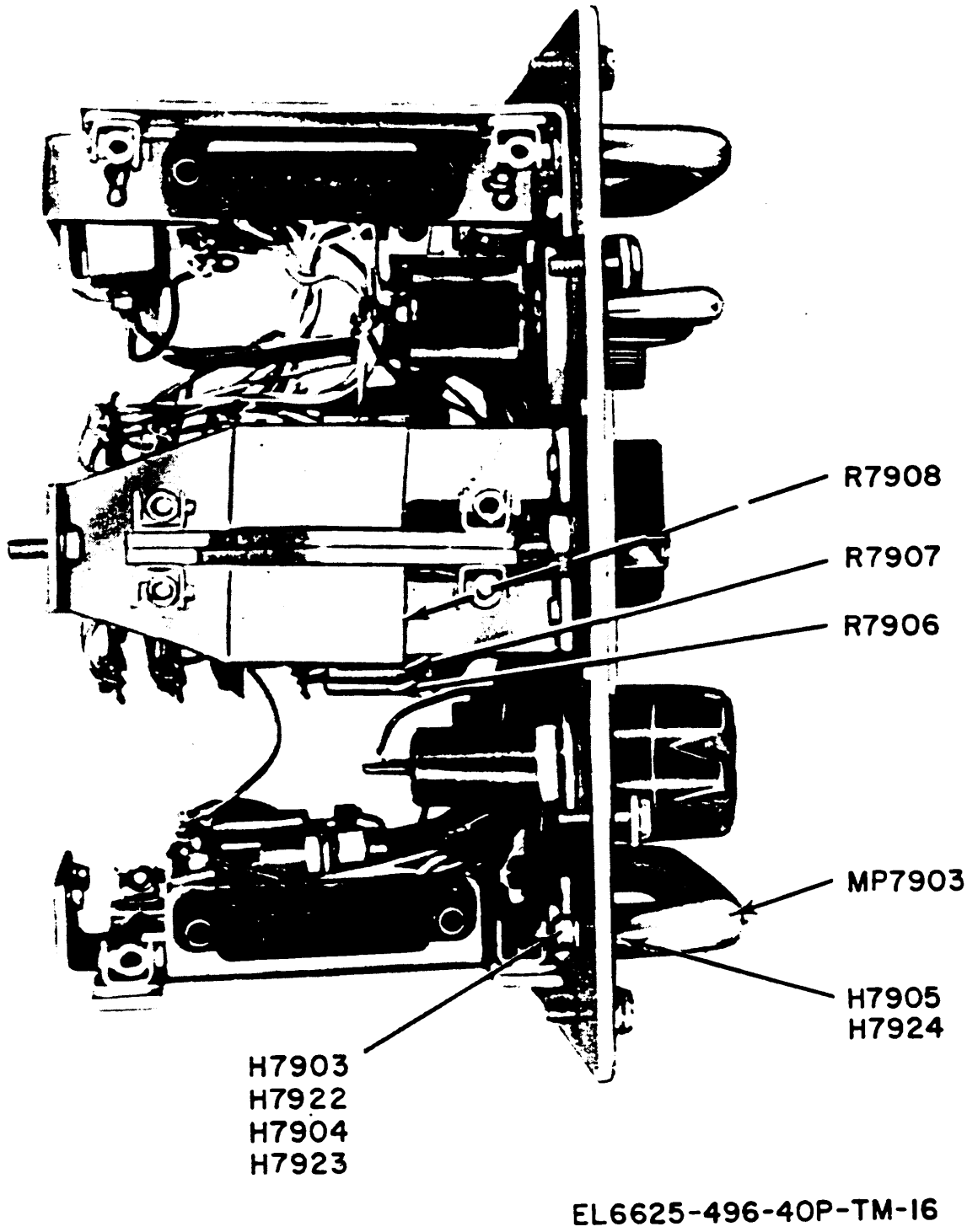


Figure 55. Test set, front panel and chassis, bottom view.

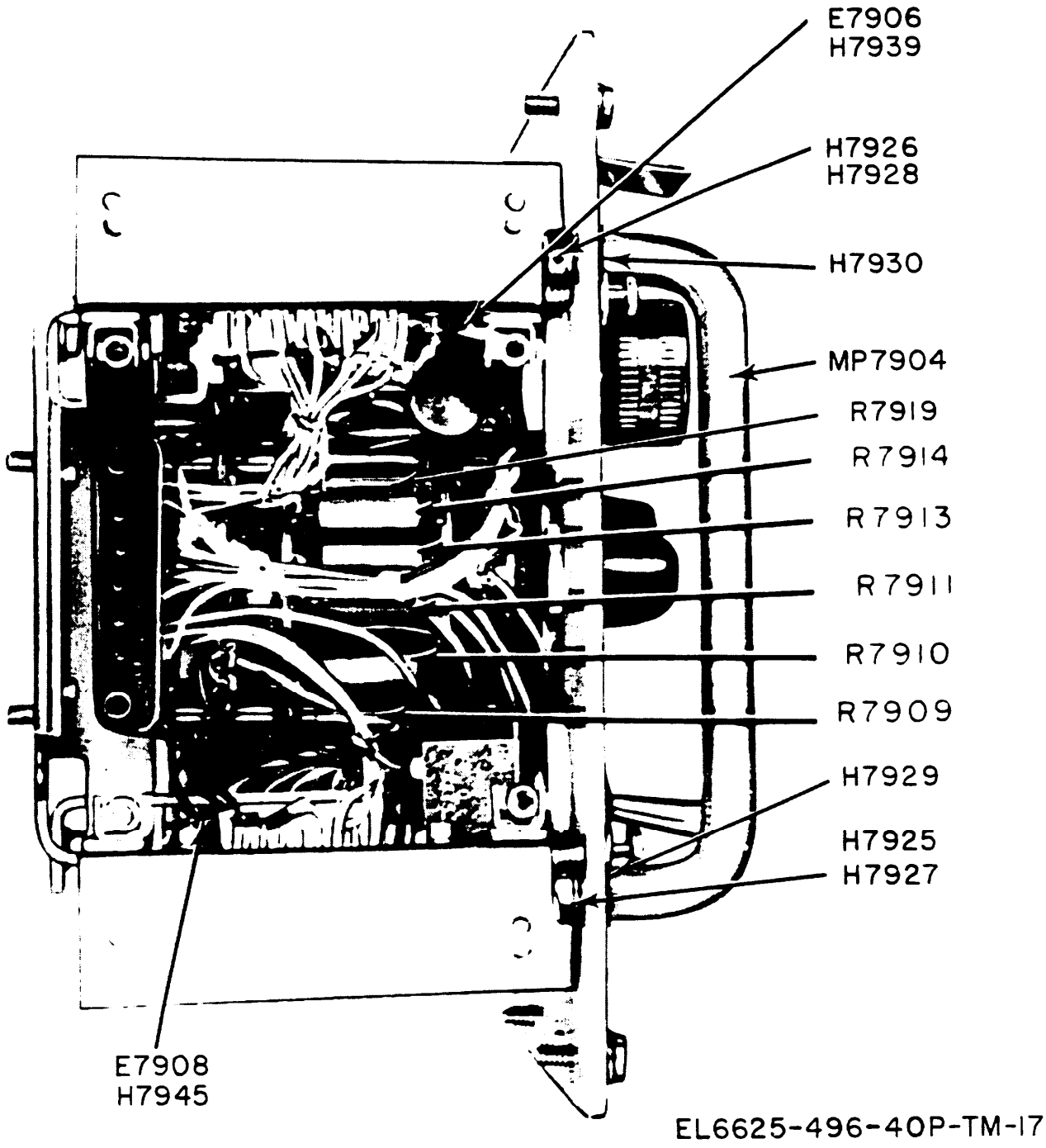


Figure 56. Test set, front panel and chassis, left view.

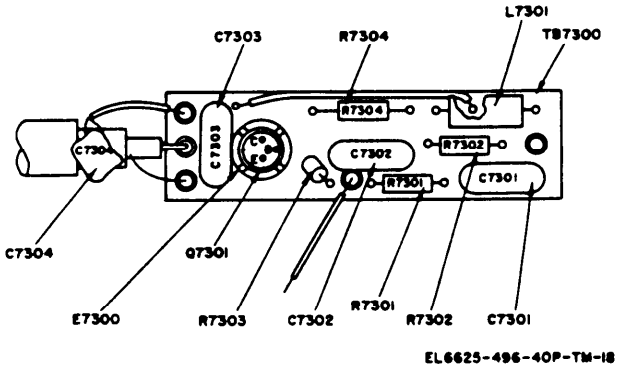


Figure 57. Test probe, radiofrequency preamplifier.

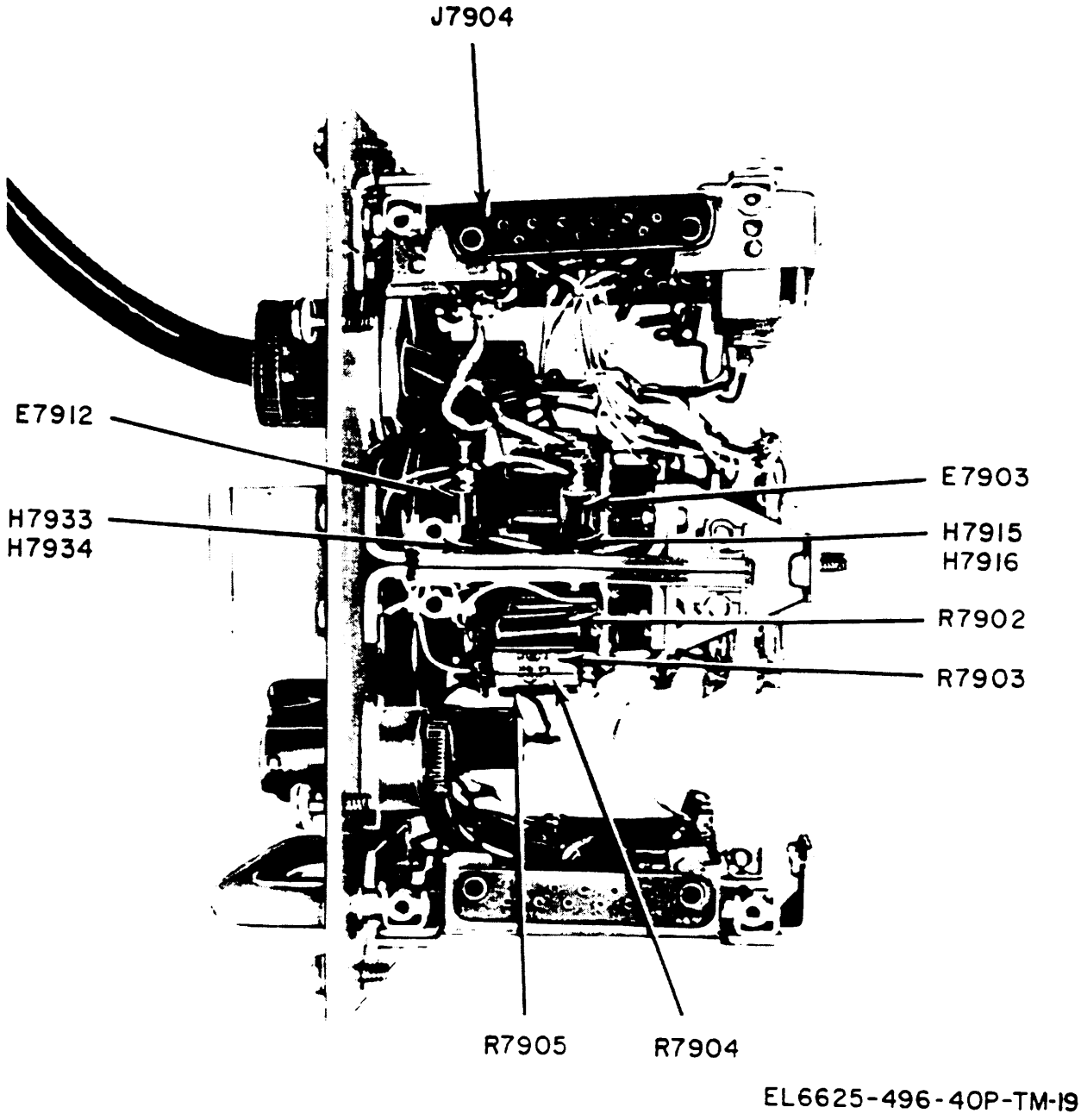


Figure 58. Teat set, front panel and chassis, top view.

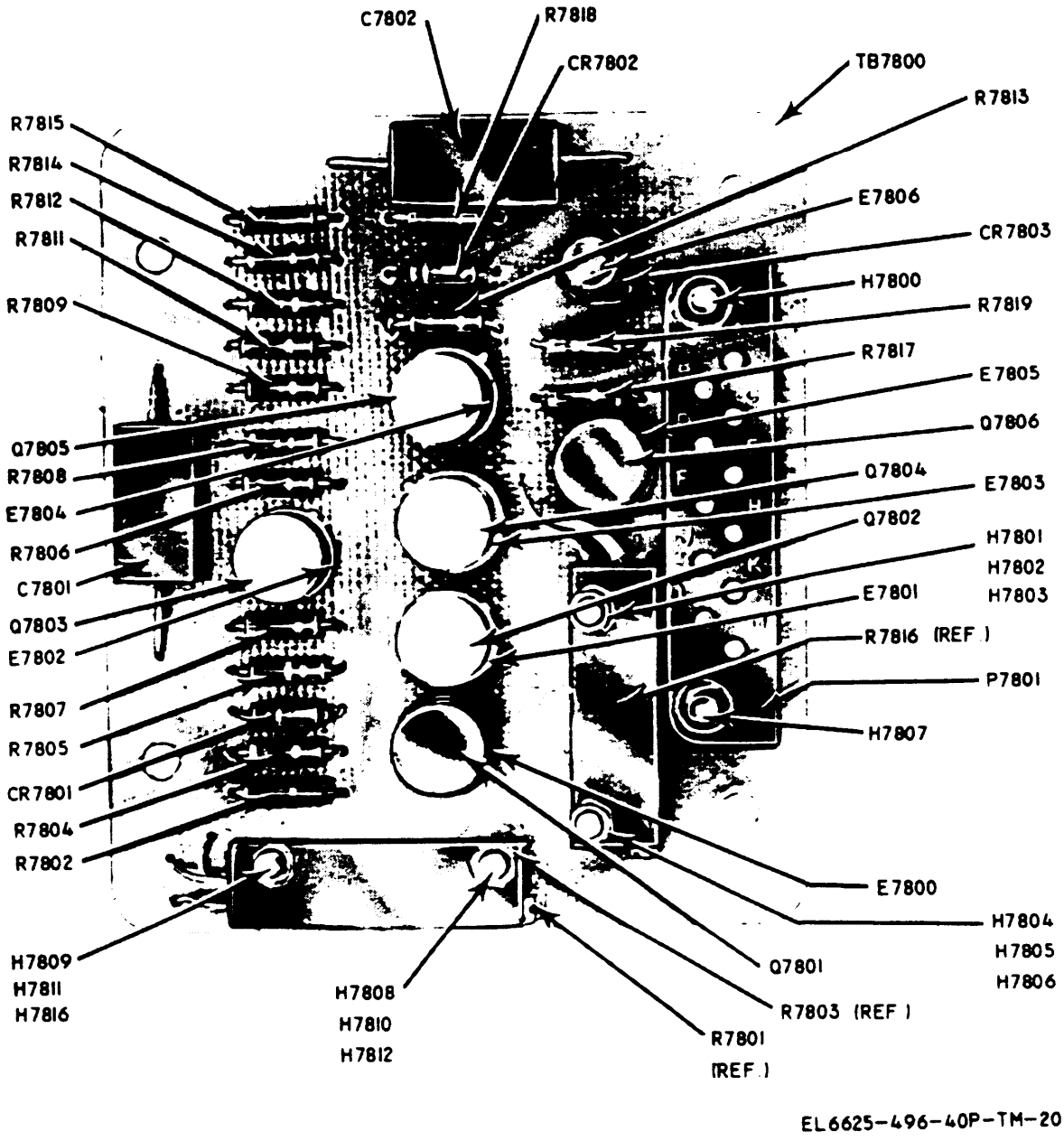


Figure 59. Lamp driving gates printed circuit card 7800.

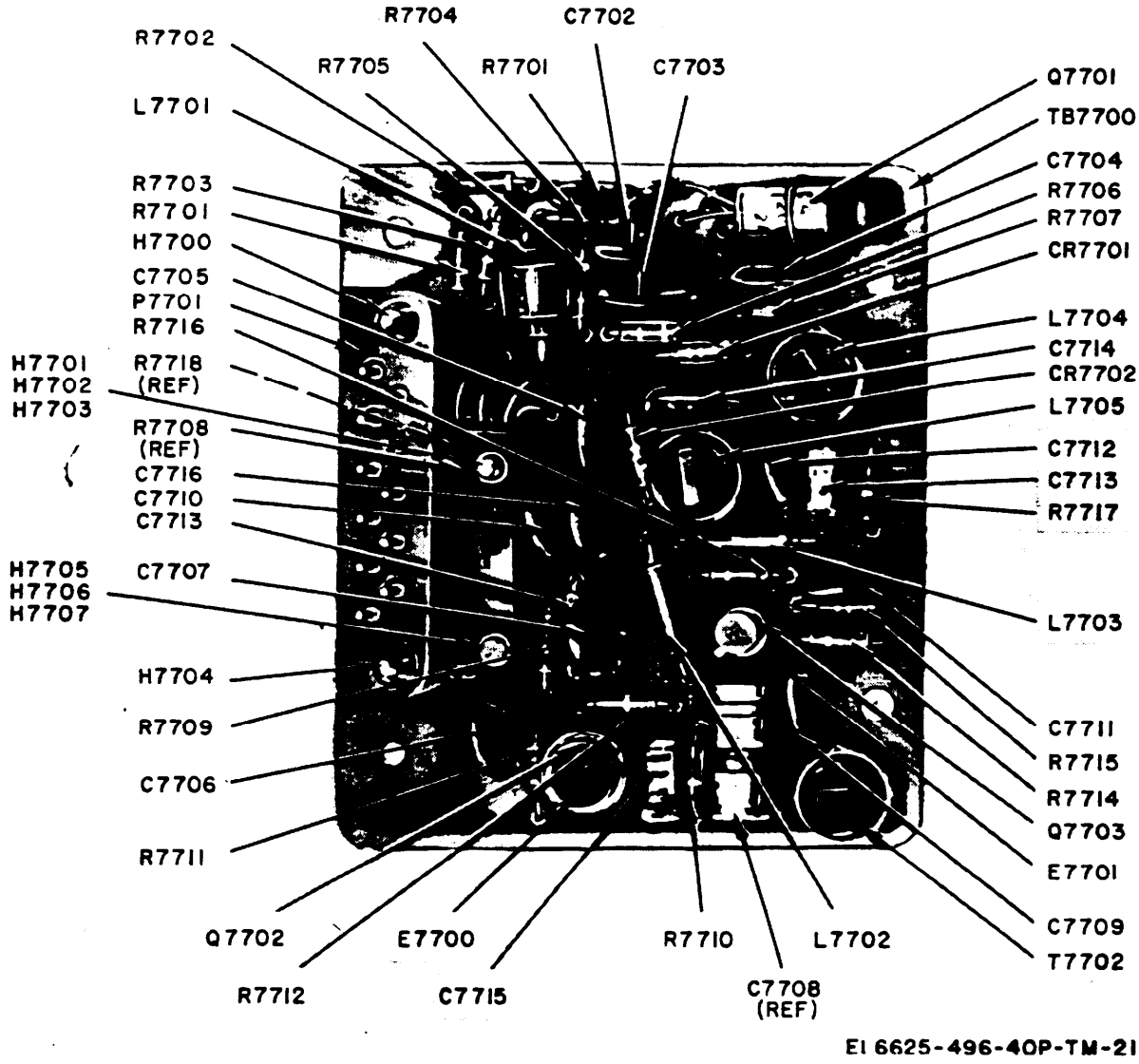


Figure 60. Radiofrequency amplifier printed circuit card A 7700.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, *United States Army*
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-51 (qty rqr block No. 599) Direct and General Support Maintenance requirements for AN/VRC-12.

TM 11-6625-496-45
C 4

CHANGE
No. 4

HEADQUARTERS
DEPARTMENT OF THE *ARMY*
WASHINGTON, D.C. *9 July 1970*

GS and Depot Maintenance Manual

Including Repair Parts and Special Took Lists

TEST SETS AN/VRM-1 AND AN/VRM-1A

TM 11-6625-496-45, 3 July 1962, is changed as follows:

The title of this manual is changed as shown above.

NOTE

"GS" maintenance stands for general support maintenance. All references in this manual to "fourth echelon" or "fourth echelon maintenance are the same as GS or general support maintenance.

Throughout the manual change the following figure references as indicated

From	*To*
12	12 and 12.1
l3	18 and 13.1
15	l5 and l5.l
16	l6 and l6.l
17	l7 and l7.l
18	l8 and l8.l
23	23 and 23.l
30	30 and 30.1
38	38 and 38.1
39	39 and 39.l

Page 2, paragraph 1. Make the following Changes:

Subparagraph c (page 1 of C 3), last line. Change "(NMP)-MA" to: NMP-EM.

Add subparagraph d after subparagraph c.

d. All references in this manual to ANmRM-1 and TS-1777/VRM-l also apply to AN/VRM-1A and TS-1777A/VRM-l. Model differences are described in (1) through (4) below.

(1) Test Set, Radio TS-1777A/VRM-l (part of Test Set, Radio AN/VRM-lA) is identical with Test Set, Radio TS-1777/VRM-l (part of Test Set, Radio AN/VRM-1) except for the case and cover.

(2) The TS-1777/VRM-l and TS-1777A/VRM-l front panel and attached chassis are mechanically and electrically identical with each other and may be mounted in the case of either the TS-1777/VRM-l or TS-1777A/VRM-l ((3) below) .

(3) In the TS-1777/VRM-1, the case has six latches, the chassis panel is flush with the edge of the case, and the gasket in the cover is on the edge of the cover. In the TS-1777A/VRM-1, the case has four latches, the chassis panel is sunk below the edge of the case, and the gasket in the cover is recessed (fig. 11.1).

(4) On instruction plates for the TS-1777A/VRM-1 (TM 11-6625496-12), an additional instruction in the first plate advises the user to return good modules to the radio set, and on the second plate, switch position 19 is used instead of position A for test No. 11 of crystal reference system A3000.

NOTE

New plates should be requisitioned for those tat sets that do not have plates described in (4) above

Paragraph 2 *f,* line 9. Change “22 volts” to: 21.5 volts.

Page 5, figure 2. Make the following changes:

Change the resistance value of “R7612” and “R7613” to: 51 (ohms). Add the following:

NOTE

In some units, the resistance value of R7612 is 75 ohms and R7613 is 33 ohms.

Page 11, figure 8. Make the following changes.

Change the resistance values of “R7818" to “51 (ohms) “ and “R7819” to “8.2K"

Add the following:

NOTE

In some units, the resistance value of R7818 is lK and R7819 is lK.

Page 12, paragraph 13 *b,* line 4. Delete "TP3002"

Page 16, add paragraph 27.1 *and figure* 10.1 after paragraph 27.

27.1. Selector Switch Position 1.

(fig. 10.1)

When selector switch is in position 19, the +13.5 (±1)-volt dc output of module A2100 to relay K3001 in assembly A3000 can be tested. The tested voltage is connected through rf choke L7301 and voltage dropping resistors R7919 and R7920 to the voltage supply limits sensing circuit. The output of this circuit is applied to the Schmitt trigger circuit. If the voltage is within limits, GREEN indicator lamp DS7092 lights. If the voltage is not within limits, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator lamp DS7901 lights. The operating voltage for the Schmitt trigger is supplied from the +16-volt dc line.

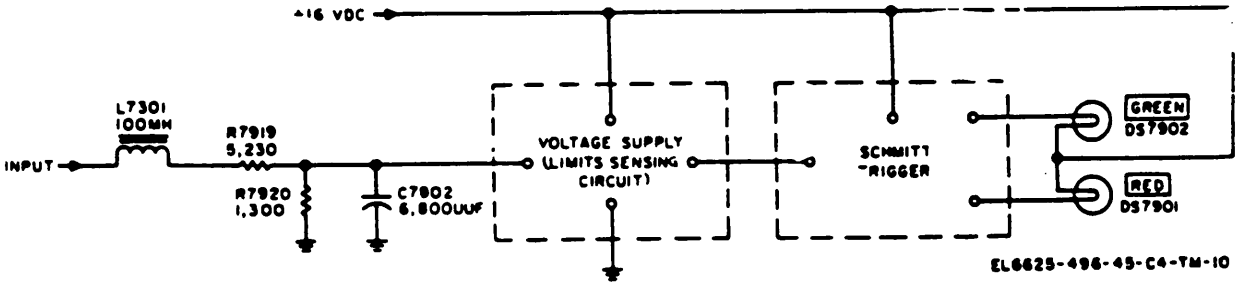


Figure 10.1. Test in selector switch position 19, simplified schematic diagram

Page 19, paragraph 33 *d.* Add the following note below the heading:

NOTE

If a component is detected as defective in assemblies A7300 through A7800, replace the affected assembly. (Repair parts for assemblies are not provided.)

Page 23. Delete figure 11 and substitute new figure 11.

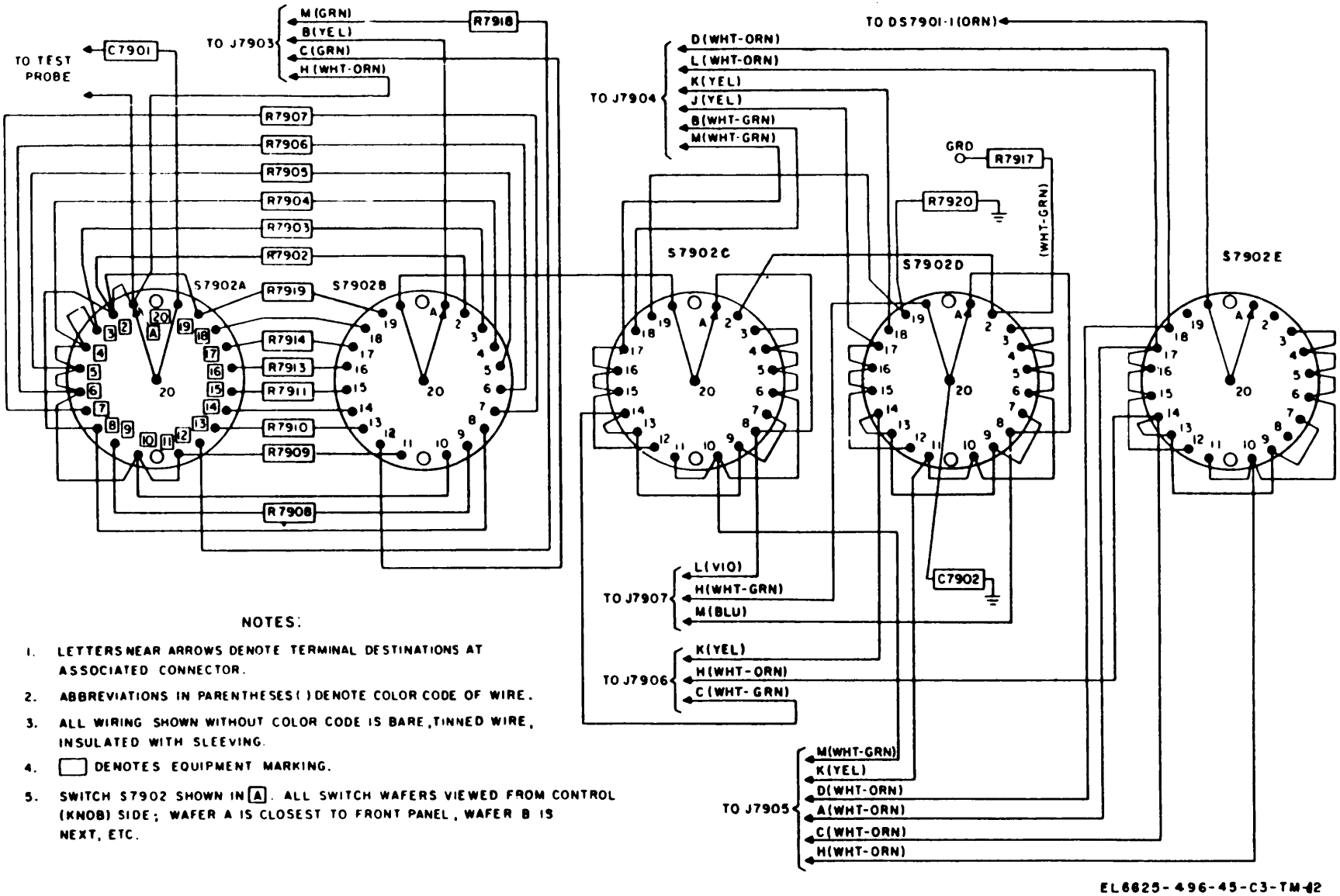


Figure 11. Selector switch S7902, wiring diagram.

Add figure 11.1 after figure 11.

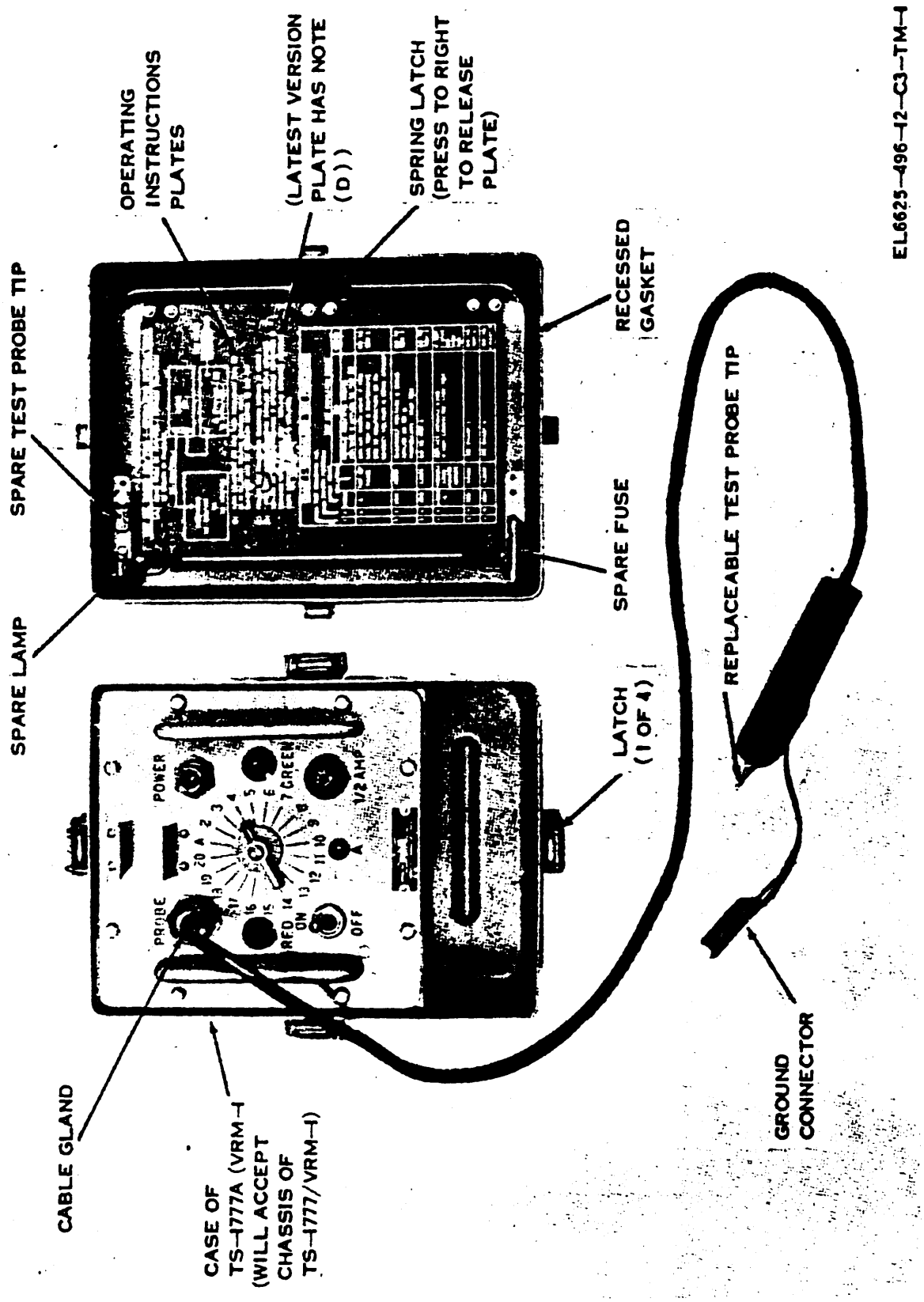


Figure 11.1. Test Set, Radio TS-1777A/VRM-1.

Page 24, paragraph 36. Add the following as the introductory paragraph:

The front panel and chassis of the TS-1777/VRM-1 (AN/VRM-l) and TS-1777A/VRM-l (fig. 11.1) (AN/VRM-lA) are identical in dimensions but the case of each is different (para 1 *d).* Consequently, the front panel and chassis of either odel can be put in the case of the other model

Page 33, paragraph 43. Designate the existing note as 1 and l dd the following notes:

NOTE 2

All test voltages (ac and dc) applied to the test probe *(c* through *h* below) shall be increased gradually and shall be applied instantaneoualy after each increment; and the signal source shall not be connected to the test set while the level of the applied voltage is being changed or while the adjustment control in the test set under test is being changed. Therefore, the procedures in *c* through *h* below shall be performed in such a way as to accommodate this instantaneous application of the test voltages

NOTE 3

The light indication change should be almost instantaneous at the moment of touching the test probe to the applied test voltage, except for the 1000-Hz (audio) tests given in- e below. Thus, in the audio test the light change should occur within *10 seconds* after the application of the proper voltage to the test probe.

NOTE 4

Refer to the appropriate adjustment procedures given in *c* through *h* below when the test requirements of a particular circuit (para 47 through 51, and 64 through 67) cannot be obtained.

Page 35, paragraph 43c(10), last line. Change "13.0 volts to: 13.5 Volts. (When the GREEN indicator goes out, the RED indicator should light.)

Paragraph 43e(l) (b), line 2. Change “ME-20B/U” to: AN/URM-145.

Page 36, paragraph 43h (6), last line. Change “210 mv” to: 115 mv.

Page 37. Add new figure 23.1 after figure 23.

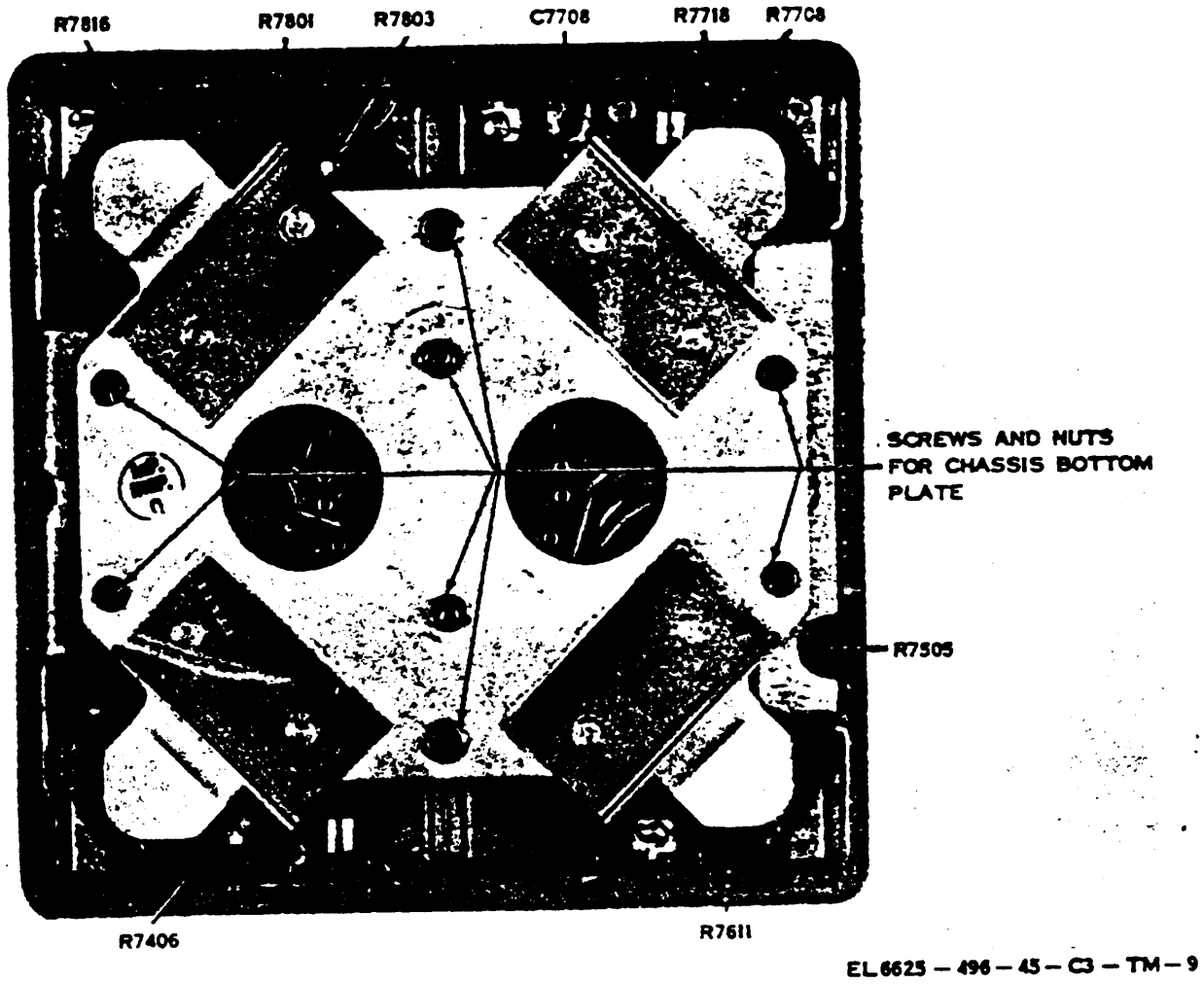


Figure 23.1. TS-1777A/VRM-1 (and later production units of TS-1777/VRM-1), bottom view and location of adjustable controls.

Paragraph 44. Add subpagraph *c* after subparagraph *b*.

c. Refer to the appropriate adjustment procedures given in Paragraph 62 through 69 when the test requirement of a particular circuit (para 47 through 51) cannot be obtained.

NOTE

All test voltages (ac and dc) applied to the test probe in the procedures given in Paragraph 47 through 51 shall be increased gradually and shall be applied instantaneously after each increment; the signal source shall not be connected to the test probe while the level of the applied voltage is being changed or while the control on the test set is being changed. Therefore, the procedures given in paragraph 47 through 51 shall be performed in such a way as to accommodate this instantaneous application of the test voltages The light indication change should be almost instaneous at the moment of touching the test probe to the test voltage, except for the 1000-Hz (audio) tests (para 48). Thus in the audio tests, the light change should occur *within 10 seconds after* the application of the proper voltage to the test probe.

Page 41, paragraph 47c. Make the following

changes in the "Performance Standard" column.

In step 2b, change "+14.2" to: between +13.40 and +15.00.

In step 2c, change "+17.6" to: between +17.30 and +19.50.

In step 3b, change "+20.7" to: between +19.00 and +21.80.

In step 4b, change "+10.50" to: between +9.90 and +1120.

In step 4c, change "+13.00" to: between +12.70 and +14.20.

Add step No. 5 after step No. 4.

Step No.	*Test* equipment *control settings*	*Equipment under test control settings*	*Test procedure*	*Performance standard*
5	Sane as step No. 4	Same as step No. 1 except: Selector switch: 19	*a.* Same as step No. 4a.	a RED indicator lights.
			b. Same as step No. *4b.*	*b.* TS-443/U indi-*cdes* between- +13.00 and +14.70 volts.

Page 43, paragraph 48c. Make the following changes:

Add the following after the heading of subparagraph *c:* The light indication change to GREEN may occur instantaneously, but if it does not the change should occur within *10 seconds after required voltage limits are* applied to the test probe.

Make the following changes in the "Perfomance Standard" column:

In step lb, change "2.85" to: between 2.60 and 3.30.

In step 2b, change "U3" to: between 1250 and 14.90.

In step 3b, change "0.49" to: between .450 and .520.

In step 4b, change '0.90" to: between .800 and 1.00.

In step 5b, change "0.225" to: between .200 and .250.

In step 6b, change "6.40" to: between 6.00 and 7.30.

Page 47, paragraph 49c. Make the following changes in the "Performance standard" column:

In step No. lc, change "0.180" to: between .125 and .250.

In step No. 2c, change "0.220" to: between .200 and .250.

In step No. 3c, change "0.480" to: between .170 and 210.

In step No. 4c, change "0.720" to: between .650 and .810.

Page *51,* paragraph 50c. Make the following changes in the "Performance standard" column:

In step No. lb, change "0.27" to: between 0230 and .330.

In step No. 2b, change "0.130" to: between .100 and .140.

In step No. 3b, change "0.225" to: between .180 and .250.

In step No. 4b, change "0.014" to: between .012 and .016.

Page 53, paragraph 51c. In "Performance standard" column, change subparagraph b to read: 411A indicates between .100 and .135 volt.

Page 54, paragraph 52, chart. Delete the chart and substitute:

Selector switch S7902 *position*	Signal at probe tip			*Indicattor*	
	Type	*Frequency*	*Voltage*	*RED*	*GREEN*
A	Note 1)	·	·	x	
	1Note 2)	·	·		x
	dc	·	+7.0	x	
	dc	·	+13.4 40-15.00		x
	dc	·	+17.30-19.50	x	
2	dc	·	+10.0	x	
	dc	·	+19.00-21.00		x
3	af	l kc	1.4	x	
	af (Note 3)	l kc	2.60-3.30		x
4	af	l kc	7.0	x	
	af (Note 3)	l kc	12.50-14.80		x
5	af	l kc	0.25	x	
	af (Notc3)	l kc	0.450-0.520		x
6	af	l kc	0.45	x	
	af (Note 3)	l kc	0.800-1.00		x
7	rf	11.5 mc	0.13	x	
	rf	11.5 mc	0.230-0.330		x
8	dc	·	+5,0	x	
	dc	·	+9.90-11.20		x
	dc	·	+12.70-14.20	x	
9	rf	11.5 mc	0.06	x	
	rf	11.5 mc	0.100-0.140		x
10	af	1 kc	0.11	x	
	af (Note 3)	1 kc	0.200-0.250		x
11	af	1kc	3.2	x	
	af (Note 3)	1 kc	6.00-7.30		x
12	rf	5.65 mc	0.08	x	
	rf	5.65 mc	0.1250.250		x
13	rf	11.5 mc	0.11	x	
	rf	11.5 mc	0.180-0.250		x
14	rf	11.5 mc	0.007	x	
	rf	11.5 mc	0.012-0.016		x
15	rf	5.65 mc	0.11	x	
	rf	5.65 mc	0.200-0.250		x
16	rf	5.65 mc	0.24	x	
	rf	5.65 mc	0.180-0.210		x
17	rf	5.65 mc	0.36	x	
	rf	5.65 mc	0.650-0.810		x
18	rf	47.0 mc	0.10	x	
	rf	47.0 mc	0.100-0.135		x
19	dc	·	+5.0	x	
	dc	·	+13.00-14.70		x

Notes:

1. ON-OFF switch at ON.
2. Test probe tip in test jack A.
3. GREEN indication occurs within *10 seconds after* application of required voltage.

Page 55, paragraph 54b (3), chart Add the folwing item to the chart:

Test equipment	*Technical manual*
multmeter, Electronic AN/URM-146	TM 11-6625-524-15-1

Pages 59. Add figure 30.1 after figure 30.

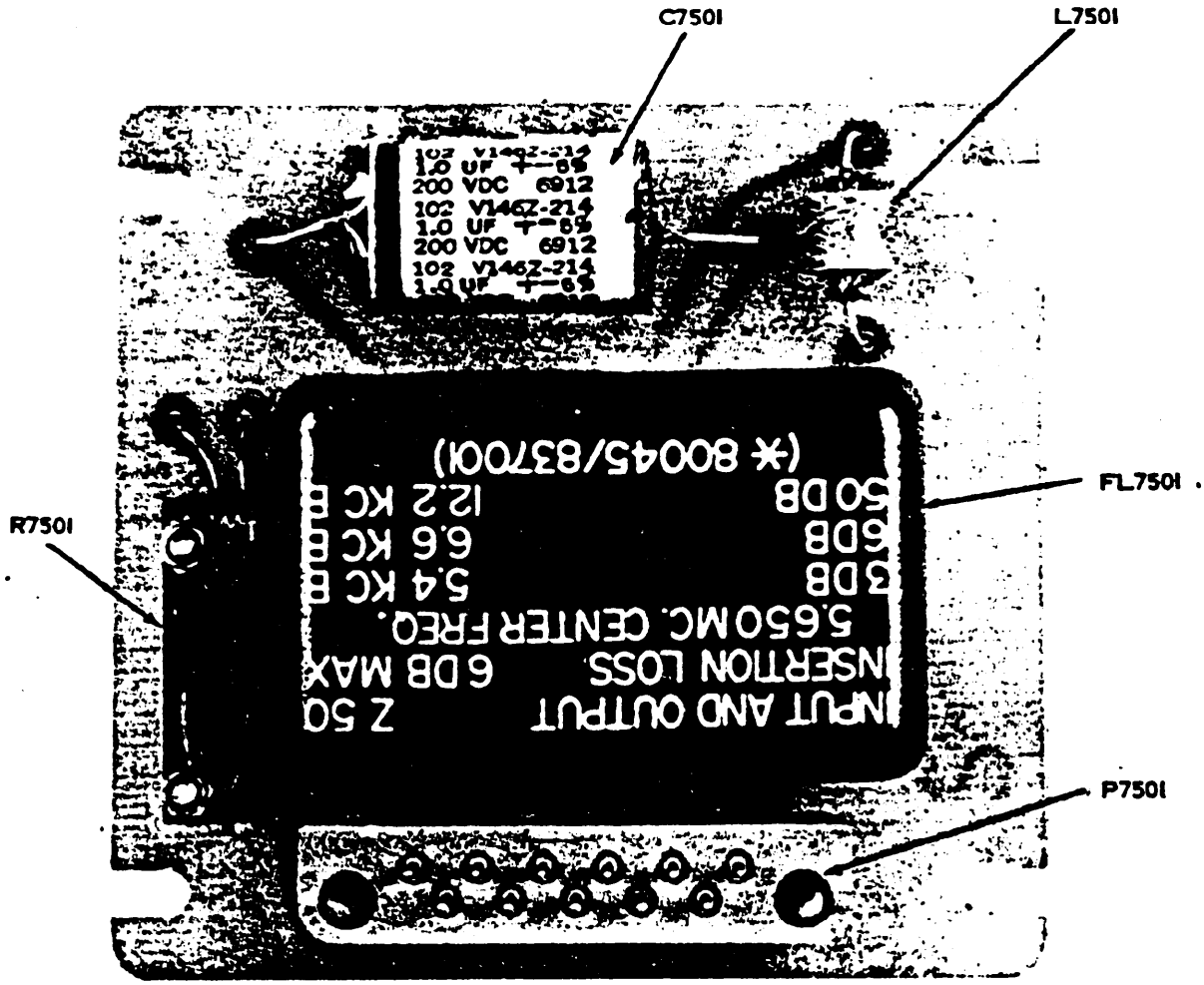


Figure 30.1. Assembly A7500 in TS-1777A/VRM-1 in later production waits of TS-1777/VRM-1, parts location

Paragraph 57d(2), Change "ME-30B/U“ to: AN/URM-145

Page 60, paragraph 58d(2), line 48 Change “ME-30B/U” to: AN/URM-14S

Page 61, paragraph 58, Make the following changes:

subparagraph d(2)(a), chart, In “Signal voltsage(rms)change the first line from "81 mv" to: 18 mv.

Subparagraph *h(2)*, line 5. Change "ME 30B/U to: AN/URM-145.

Page 63, figure 31. In figure 31, change callout "Q7606-C" to: Q7602-C.

Page 65 (page 2 of C 2), paragraph 61a, chart. Delete the chart and substitute:

(1) TM 11-6625-496-12, with current changes.
(2) TM 11-6625-496-45, with current changes.
(3) TB SIG 355-1.
(4) TB SIG 355-2.
(5) TB SIG 355-3.

Page 3 of C 2, paragraph 61b, line 4. Change "DA Pam 310-4" to: DA Pam 310-7.

Page 66 (page 3 of C 2), paragraph 63. Add the subparagraphs *d, e, and f* after subparagraph c.

d. All test voltages (ac and dc) applied to the test probe in the procedures given in paragraphs 64 through 69 shall be increased gradually and shall be applied instantaneously after each increment, and the signal source shall not be connected to the test probe while the level of the applied voltage is being changed, or while the adjustment control in the test set under test is being changed. Therefore, the procedures given in paragraphs 64 through 69 shall be performed in such a way as to accommodate this instantaneous application of the test voltages.

e. The light indication change should be almost instantaneous at the moment of touching the test probe to the test voltage, except for the 1,000-Hz (audio) tests given in paragraph 66. Thus, in the audio tests, the light change should occur *within 10 seconds after* the application of the proper voltage to the test probe.

f. Refer to the appropriate adjustment procedures (paragraph 43) when the requirements of a parrticular circuit (para 64 through 69) cannot be obtained.

Page 67 (page 5 of C 2), paragraph 65e, make the following changes:

Line 3, change "RED" to: GREEN.

Line 4, change "GREEN" to: RED.

Page 69, appendix I (page 1 of C 3). Add the following to the appendix.

TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TM 11-6625-524-15-1	Operator, *Organizational*, DS, GS, and Depot Maintenance Manual: Electronic Voltmeter AN/URM-145.

Page 75, figure 38. Make the following changes:

To positions "A","2", and "8" of switch S7902E, front, add position 19 and put the number in a box.

Change the figure caption to: TS-1777/VRM-1, early production units, power distribution diagram.

By Order of the Secretary of the Army

W.C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-51 Direct/General Support maintenance literature for AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48, AN/VRC-49 radio equipment.

Field (Fourth Echoion) and Depot Maintenance Manual

TEST SET, RADIO AN/VRM-1

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *23 April 1964*

TM 11-6625-496-45, 3 July 1962, is changed as follows:

Page 2, paragraph 1. Delete subparagraph *c* (including the note) and *d* and substitute:

c. For applicable forms and records, see paragraph 2. TM 11-6625-496-12.

d. The direct reporting, by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended changes to DA technical manual parts lists or supply manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplcate by the use of pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, N.J. 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor, etc.).

Add paragraph 1.1 after paragraph 1:

1.1. index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply manuals (types 4, 6, 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

Page 5, figure 2, FIRST 11.5 MC AMPL (as changed by C 1, 13 Jan 64). Change transistor Q7601 type from "2N502" to: 2N502B.

Page 6, figure 3 (as changed by C 1, 13 Jan 64). Change the value of R7707 from " 1800" to: 5.6K.

Page 7, paragraph 8a(2) (as change by C1,13 Jan 64). At the end of subparagraph (2), insert:

Note. In some test" probes, L7302 has been replaced by 270-ohm resistor R7304. A 510-µµf capacitor C7304 has been added. (See note in figure 5.) Capacitor C7302 has been removed.

Figure 4, FIRST 47.0 MC AMPL (as changed by C 1, 13 Jan 64). Change the transistor Q7702 type from "2N502A" to: 2N502B.

After paragraph 8a(2) add (as added by C 1, 13 Jan 64):

(3) To eliminate undesired high frequency oscillations, some RF amplifier test probes have been modified as follows (note 1, fig. 5.1).

(a) Inductor 1.7302 has been removed.

(b) Resistor R7304 and C7304 have been wired in as shown in figure 5.1.

(4) To eliminate undesired high frequency oscillations in RF amplifier test probes that me permanent] y sealed, components have been added to the test probe outputs (note 2, fig. 5.1) as follows:

Resistor R7304 and a 0.l-µf capacitor are connected in series and wired between the RF output of the probe and ground (fig. 5.1).

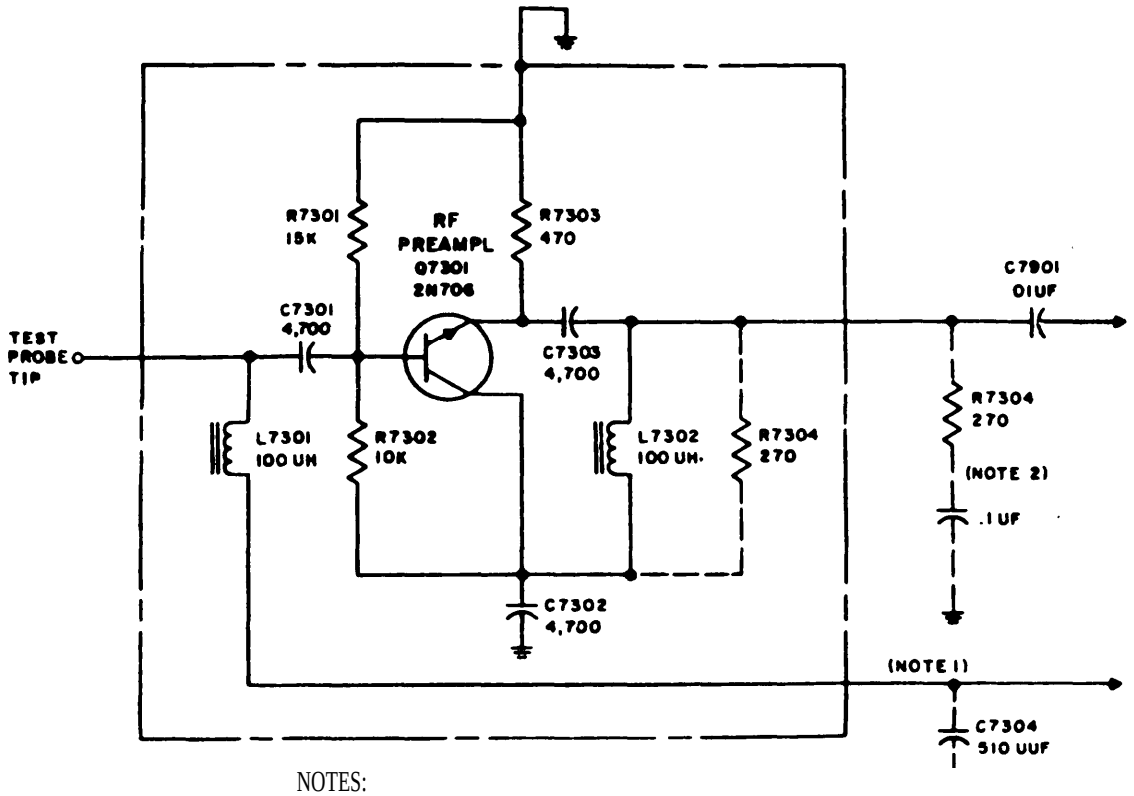
(b) A 510-µµf capacitor is connected between the audio output of the. probe and ground.

(c) These components are mounted inside the case of the test set near the entrance of the probe cable.

Page 8. (As added by C 1, 13 Jan 64) After figure 5, insert figure 5.1.

Page 15, D of figure 10 (as changed by C 1, 13 Jan 64). Change the value of R7911 to: 84.5.

***This change supersedes C1, 13 January 1964.**



NOTES:
1. IN SOME SETS L7302 HAS BEEN REMOVED AND R7204 AND C7304 HAVE BEEN WIRED IN AS SHOWN.
2. IN SOME SETS C7304, R7304, AND THE .1 Of CAPACITOR ARE CONNECTED AS SHOWN AND MOUNTED INSIDE THE TEST SET CASE.
3. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS.

TM6625-496-45C1-1

Figure 5.1. Test probe RF preamplifier, showing changes in wiring of components.

Page 16, paragraph 26 (as changed by C 1, 13 Jan 64) Make the following changes:

Subparagraph a, line 6. Change "'113" to: 66.5.

Subparagraph *b*, line 7. Change "200" to: 402.

Page 22, paragraph 34, chart (as changed *of* C 1, 13 Jan 64). Change the values of the following resistors:

R7911. From "22.1" to: 84.5.

R7913. From" 113" to: 66.5.

R7914. From "200" to: 402.

Page 65. Delete section II and substitute:

Section II. DEPOT INSPECTION STANDARDS

caplicability of Depot Inspection standards

The tests outlined in this section are designed to measure the" performance capability of a repaired equipment. Equipment that is to be returned to stock should meet the standards given in these tests.

61. Applicable References

a. Technical Publications The following technical publications are applicable to this equipment:

Title	Number	Date
Field (Fourth Echelon) and Depot Maintenance Manual: Test Set, Radio AN/VRM-1.	TM 11-6625-496-45	3 July 1962
Operator and Organizational Maintenance Manual: Test Set, Radio AN/VRM-1.	TM 11-6625-496-12	12 July 1962
Field (Fourth Echelon) and Depot Maintenance Repair Parts and Special Tool Lists for Test Set, Radio AN/VRM-1.	TM 11-6625-496-45P	14 September 1962

Title	Number	Date
Organizational Maintenance Repair Parts and Special Tool Lists for Test Set, Radio AN/VRM-1.	TM 11-6625-496-20P	20 July 1962
General Standards for Repaired Signal Equipment.	TB SIG 355-1	
General Standards for Refinishing Repaired Signal Equipment.	TB SIG 355-2	

b. Modification *Work Orders.* Perform all applicable modification work orders (MWO) pertaining to this equipment before making the tests Specified. DA Pam 310-4 lists all available MWO's.

62. Test Facilities Required

The following equipments, or suitable equipment, will be employed in determining compliance with the requirement of this specific standard

a. Test Equipment.

Equipment	Federal stock No.	Quantity required	Applicable literature
Generator, Signal TS-421/U.	6625-669-0228	1	TM 11-2649
Multimeter, Meter ME-26A/U.	6625-542-6407	1	TM 11-6625-200-12
Frequency Meter AN/USM-26.	6625-543-1356	1	TM 11-5057
Power Supply, Power Designs Inc., model 3026, or equivalent.	.....	1	
Generator, Signal AN/GRM-50 (As interim item, use Hewlett-Packard, model HP606-A).	.....	1	
Voltmeter, Meter ME-30A/U.	6625-669-0742	1	TM 11-6625-320-12
Voltmeter, Electronic AN/USM-98.	6625-753-2115	1	TM 11-6625-438-10
Voltmeter, Electronic AN/URM-145.	6625-973-3986	1	TM 11-6625-392-12
Power Supply PP-3514/U (Hewlett-Packard, model HP721-A).	6625-445-6933	1	
Amplifier, Radio Frequency AM-3495/U (As interim item, use Hewlett-Packard, model HP-460AR).	.....	1	

b. Additional Equipment.

Equipment	Federal stock No.	Quantity required
Adapter UG-201/U (P/O AN/USM-26).	5935-701-3090	2
Adapter UG-274B/U	5935-201-2411	1
Special junction box (fig. 34.1).		1
Special test cable (fig. 34.2).		1
Cable Assembly, Radio Frequency CG-1773A/U (4 ft).	5995-823-2987	3
Adapter, Hewlett-Packard, model HP46A-95C.		2

63. General Test Requirements

Most of the tests will be performed under conditions listed below and illustrated in figure 34.3. Testing will be simplified if connections and front panel control settings are made initially and modifications are made as required for the individual tests.

a. Connect the special test cable to the model 3206 power supply.

b Connect the three-terminal connector of the CX 7899/VRM-1 to terminals A, B, and C of the terminal connector on the special test cable.

c. Connect the four-terminal connector of the CX-7899/VRM 1 to the POWER connector on the front of the TS-1777/VRM-1.

Caution: Never apply *a* signal to the TS-1777/VRM-1 before turning on the power to the TS-1777-VRM-1.

64. Input Test

(fig. 34.3)

a. Be sure that no signal is applied to the probe of the TS-1777/VRM-l.

b. Adjust the model 3206 power supply for a 0-volt dc output.

c. On the AN/VRM-1, set the ON-OFF switch to ON and turn the selector switch to A.

d. Increase the model 3206 power supply. output and note the voltage indicated on the ME-26A/U when the RED indicator on the TS-1777/VRM-1 lights. The RED indicator must light when the indicated voltage is between 21 and 22 volts dc.

e. Connect the dc leads of the ME-26A/U to terminals A (ground) and J (B+) of the 18-terminal female connector of the CX-'7899/VRM-1. The voltage must be between 21 and 22 volts dc.

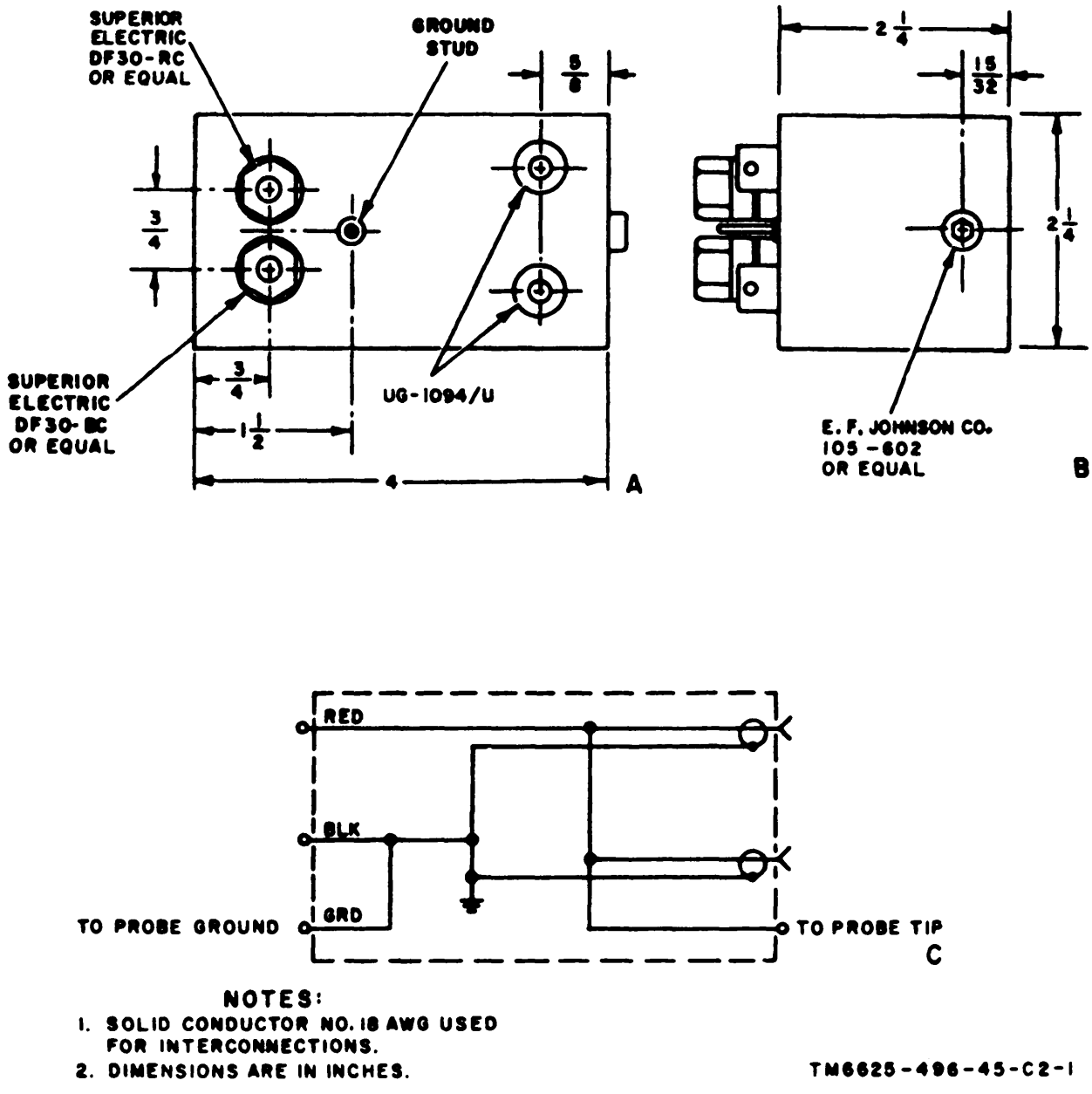


Figure 34.1. (Added) Special junction box.

f. Connect the dc leads of the ME-26A/U to terminals A (ground) and J (B+) of the 18-terminal female connector of the CX-7899/VRM-1. The voltage must be between 21 and 22 volts dc.

Note. For the remaining tests, l djust the model 3206 *power* supply form output between +23.4 and +28.6 volts dc.

g. Connect the AN/USM-98 positive lead to TS-1777/VRM-l test jack A, and the negative lead to the probe ground connector. The voltage indicated must be between 15.2 and 16.8 volts dc.

h. Insert the TS-1777/VRM-l test probe tip in test jack A. The GREEN indicator must light.

65. Output Tests

(fig. 34.4)

a. Leave the TS-1777/VRM-l ON-OFF switch in the ON position, and the selector switch at A.

b. Adjust the output of the PP-3514/U to 0 volt dc.

c. Through the special junction box, connect the output of the PP-3514/U to the TS-1777/VRM-1 probe assembly, and connect the AN/

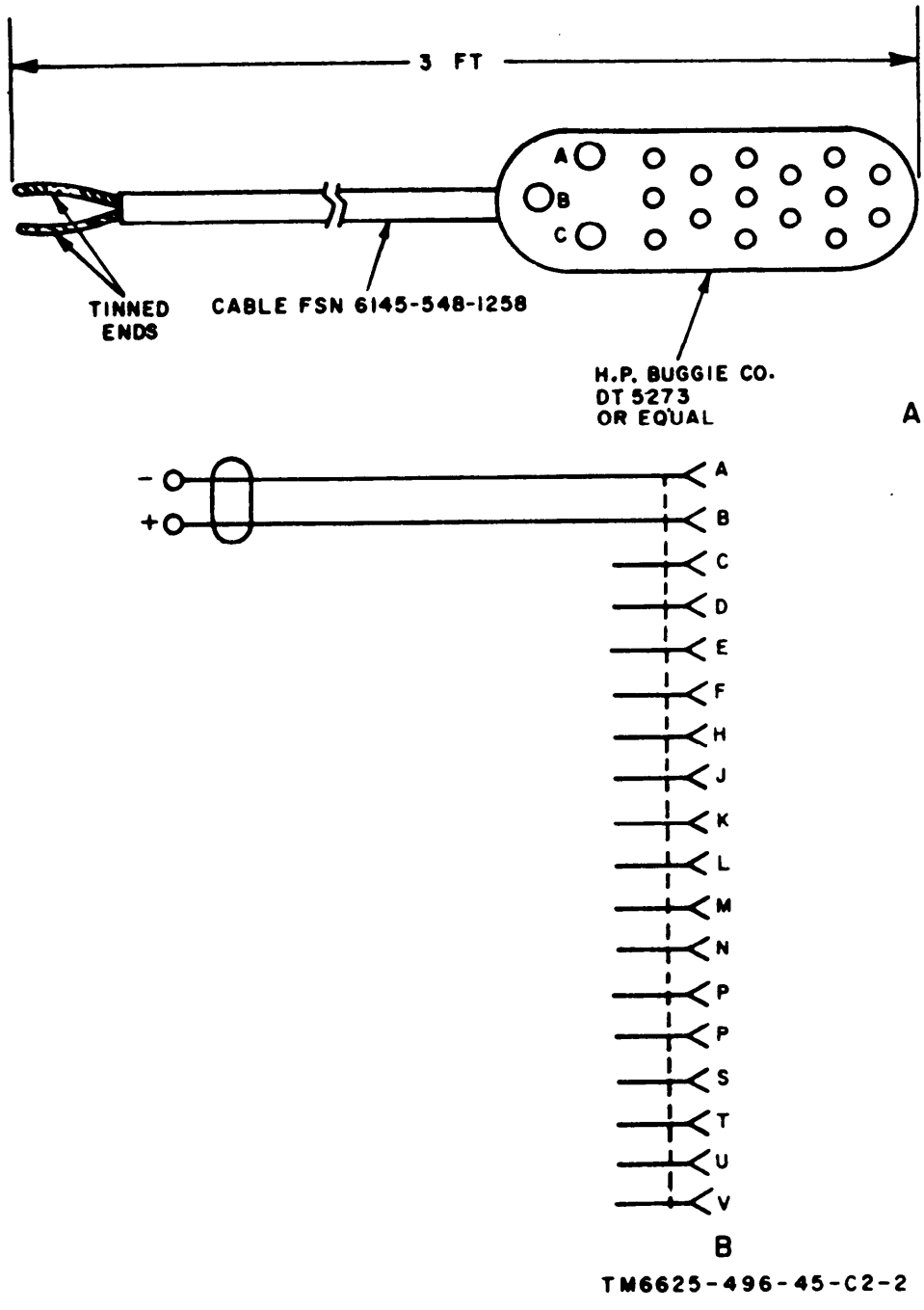


Figure 34.2. (Added) Special test cable.

USM-98 across the probe tip and the probe ground connector.

d. Carefully increase the output from the PP 3514/U and note the voltage indicated on the AN/USM-98 when the TS-1777/VRM-1 RED indicator goes out and the GREEN indicator lights. This action must occur when the indicated voltage is between 13.40 and 15.00 volts dc.

e. Continue to increase the output of the PP-3514 U and note the voltage indicated on the AN USM-98 when the RED indicator goes out and the GREEN indicator lights. This action must occur when the indication is between 17.30 and 19.50 volts. Decrease the output of the PP-3514/U to 0 volt.

f. Turn the selector switch to 2.

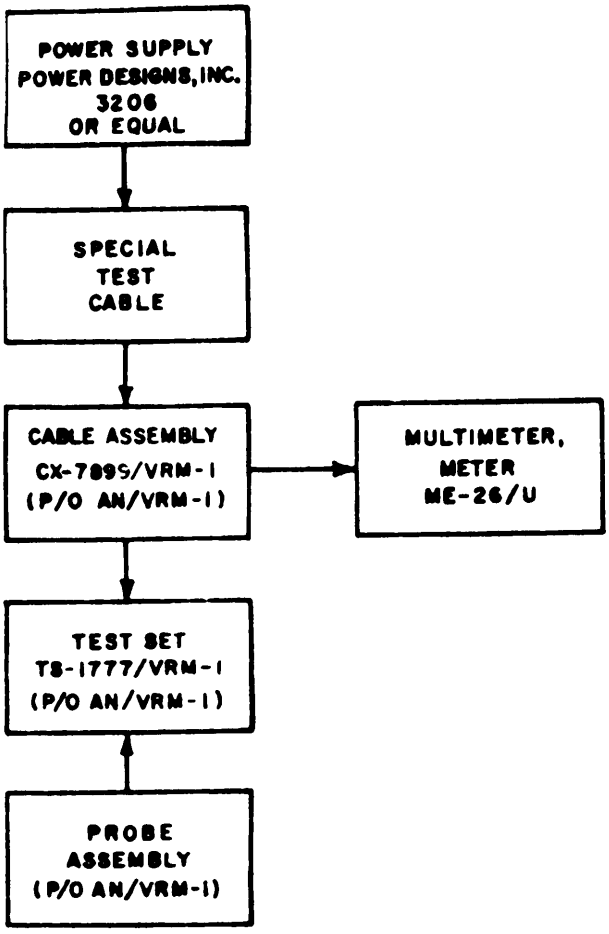


Figure 34.3. (Added) Input test setup, block diagram.

g. Carefully increase the output from the PP 3514/U and note the voltage indicated on the AN/USM-98 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 19.00 and 21.80 volts dc. Decrease the output of the PP-3514/U to 0 volt dc

h. Turn the selector switch to 8.

i. Carefully increase the output from the PP-3514/U and note the voltage indicated on the AN/USM-98 when the RED indicator goes out and the GREEN indicator lights. This action must ocur between 9.90 and 11.20 volts dc.

j. Continue to increase the output from the PP-3514/U and note the voltage indicated on the AN/USM-98 when the GREEN indicator goes out and the RED indicator lights. This action must occur between 12.70 and 14.20 volts dc. Decrease the output of the PP-3514/U to 0 volt dc.

k. Turn the selector switch to 19.

l. Carefully increase the output from the PP-3514/U and note the voltage indicated on the AN/USM-98 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 13.00 and 14.70 volts dc. Decrease the output of the PP-3514/U to 0 volt dc.

m. Remove the PP-3514/U, the special junction box, and the AN/USM-98 from the TS-1777/VRM-1 probe assembly.

66. Audio Voltage Test

(fig. 34.5)

a. Adjust the TS-421/U output to 1,000 cps ±30 as indicated on the AN/USM-26, and decrease the output to 0 volt; use the fine attenuator control.

b. Using the special junction box, connect the TS-421/U to the TS-1777/VRM-l probe assembly and connect the ME-30A/U across the probe tip and probe the ground connector.

c. Turn the TS-I777/VRM-1 selector switch to 10.

d. Carefully increase the output from the TS-421/U and note the voltage indicated on the ME-30A/U when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.200 and 0.250 volt. Decrease the out-

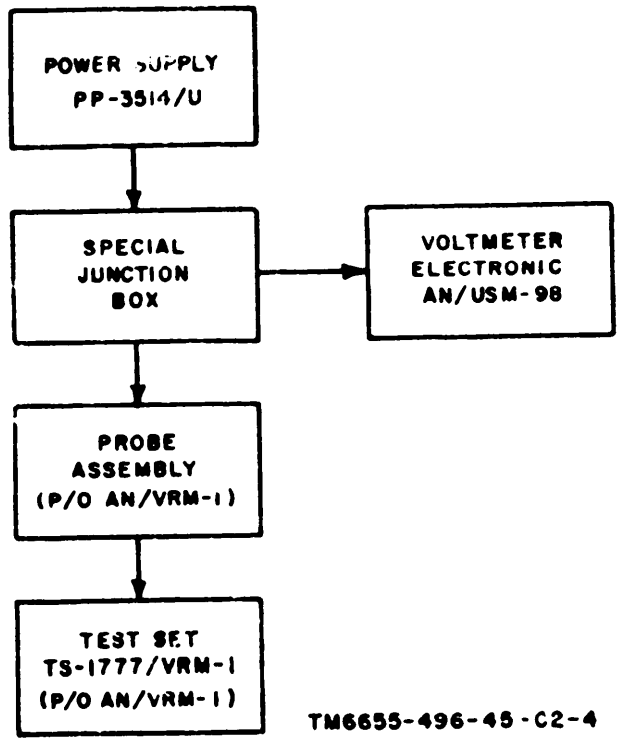


Figure 34.1 (Added) Output tests setup, block diagram

put of the TS-421/U until the RED indicator lights.

e. Turn the selector switch to 6,

f. Carefully increase the output from the TS-421/U and note the voltage indicated on the ME-30A/U when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.450 and 0.520 volt. Decrease the output of the TS421/U until the RED indicator lights.

g. Turn the selector switch to 6.

h. Carefully increase the output from the TS-421/U and note the voltage indicated on the ME-30A/U when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.800 and 1.000 volt. Decrease the output of the TS-421/U until the RED indicator lights.

i. rum the selector switch to 3.

j. Carefully increase the output from the TS-421/U and note the voltage indicated on the ME-30A/U when the RED indicator goes out and the GREEN indicator lights. This action must occur between 2.60 and 3.80 volts. Decrease the output of the TS-421/U until the RED indicator lights.

k. Turn the selector switch to 11.

l. Carefully increase the output from the TS-421/U and note the voltage indicated on the ME-80A/U when the RED indicator goes out and the GREEN indicator lights. This action must occur between 6.00 and 7.80 volts. Decrease the output of the TS-42l/U until the RED indicator lights.

m. Turn the selector switch to 4.

n. Carefully increase the output from the TS-421/U and note the voltage indicated on the ME-30A/U when the RED indicator goes out and the GREEN indicator lights. This action must occur between 12.50 and 14.90 volts. Decrease the output of the TS-421/U to 0 volt.

o. Remove the ME-80A/U, the Special junction box and the TS-421/U from the TS-1777/VRM-1 probe assembly.

47. Amplifier, 5.65-Mc, Tests

(fig. 34.6)

a. Connect the equipment as shown by the solid lines in figure 34.6. Also make temporary connections A and B.

b. Using the special junction box, connect the AN/URM-145 across the TS-1777/VRM-l probe tip and probe ground connector.

c. Turn the TS-1777/VRM-l selector switch to 12.

d. Adjust the AN/GRM-50 for an output of 5.65 mc ±100 cps as indicated on the AN/USM-26, and decrease the output to 0 volt, using the fine attenuator.

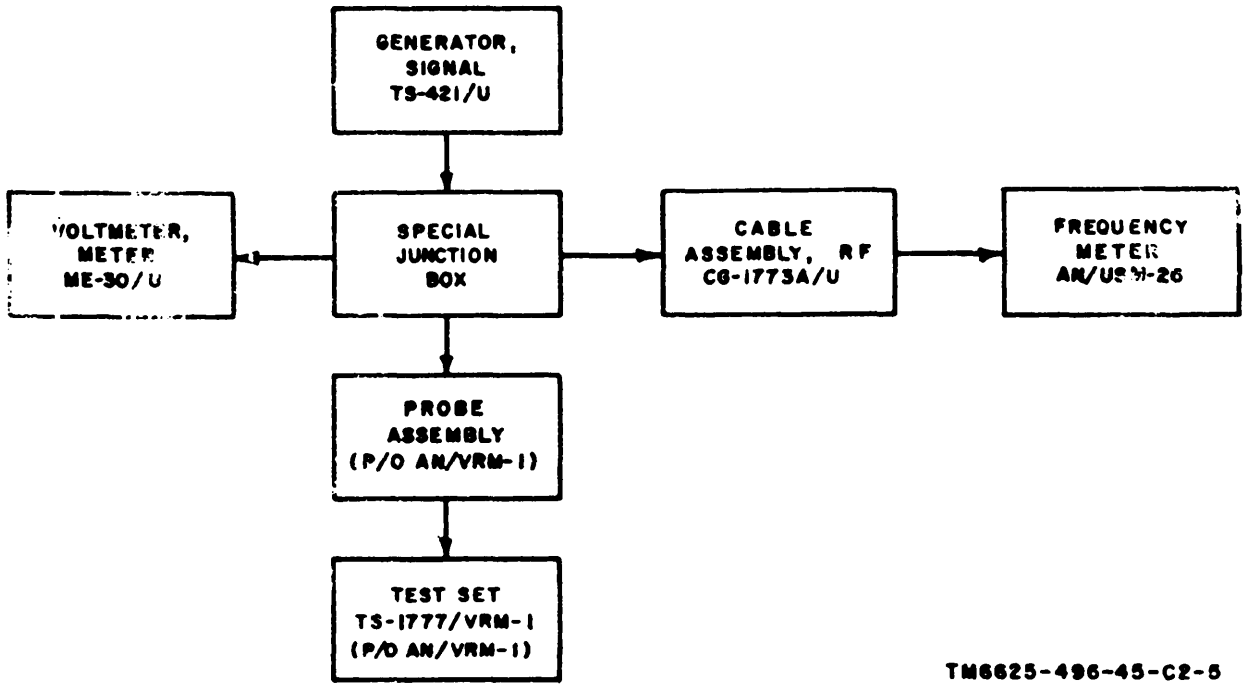


Figure 34.5. (Added) Audio voltage test setup, block diagram

a. Carefully increase the output from the AN/GRM-50and note voltage indicated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. Check to be sure that the output is still 5.65 mc ±100 cps and that the change in indicator occurs between 0.125 and 0.250 volt.

f. Remove temporary connections A and B (fig. 34.6) and make temporary connection C. Adjust the AN/GRM-50 for an output of 5.65 mc ±20 kc, as indicted on the AN/USM-26, and decrease the output to 0 volt, using the fine attenenuator.

g. Turn the selector switch to 15.

h. Carefully increase the output from the AN/GRM-50 and note the voltage indicated on the AN/URM-145 when the RED indictor goes out and the GREEN indictor lights. This action must occur between 0.200 and 0.250 volt. Decrease the output of the AN/GRM-50 to 0 volt, using the fine attenuator.

i. Turn the selector switch to 16.

j. Carefully increase the output from the AN/GRM-50 and note the voltage indicated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.170 and 0.210 volt. De crease the output of the AN/GRM-50 to 0 volt; use the fine lttenuator.

k. Turn the selector switch to 17.

L Carefully increase the output from the AN/GRM-50 and note the voltage indticated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.650 and 0.810 volt. Decrease the output of the AN/GRM-50 to 0 volt; use the fine attenuator.

68. Amplifier, 11.5-Mc, Tests

(fig. 84.6)

a. See that the special junction box is connected between the UG-274B/U and the probe assembly (with the AN/URM-145 connected to the special junction box), that the output of the AN/GRM-50 is connected to the UG-274B/U, and that the AN/USM-26 is connected direct to the UG 274B/U.

b. Adjust the AN/GRM-50 for an output of 11.6 mc ±40 kc, as indicated on the AN/USM-26, and dEcrease the output to 0 volt; use the fine attenuator.

c. Turn the selector switch to 7.

d. Carefully increase the output from the AN/GRM-50 and note the voltage indicated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.230 and 0.330 volt. Decrease the output of the AN/GRM-50 to 0 volt; use the fine attenuator.

e. Turn the selector switch to 9.

f. Carefully increase the output from the AN/GRM-50 and note the voltage indicated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.100 and 0.140 volt. Decrease the output of the AN/GRM-50 to 0 volt; use the fine attenuator.

g. Turn the selector switch to 13.

h. Carefully increase the output from the AN/GRM-50 and note the voltage indicated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.180 and 0.250 volt. Decrease the output of the AN/GRM–50 to 0 volt; use the fine attenuator.

i. Turn the selector switch to 14.

j. Carefully increase the output from *the* AN/GRM-50 and note the voltage indicated on the AN/URM- 145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.012 and 0.016 volt. Decrease the output of the AN/GRM-50 to 0 volt; use the fine attenuator.

69. Amplifier, 47. 0-MC, Test

(fig 34.5)

a. See that the special junction box is connected between the UG-274B/U and the probe assembly (with the AN/URM-145 connected to the special junction box), that the output of the AN/GRM-50 **is** connected to the UG-274B/U, and that the AN/USM-26 is connected direct to the UG-274 B/U (fig. 34.6).

b. Adjust the AN/GRM-50 for an output *of* 47.0 mc ±100 kc, as indicated on the AN/USM-26; and decrease the output to 0 volt; use the-fine attenuator.

c. Turn the selector switch to 18.

d. Carefully increase the output from the AN/GRM-50 and note the voltage indicated on the AN/URM-145 when the RED indicator goes out and the GREEN indicator lights. This action must occur between 0.100 and 0.135 volt. De crease the output of the AN/GRM-50 to 0 volt; use the fine attenuator.

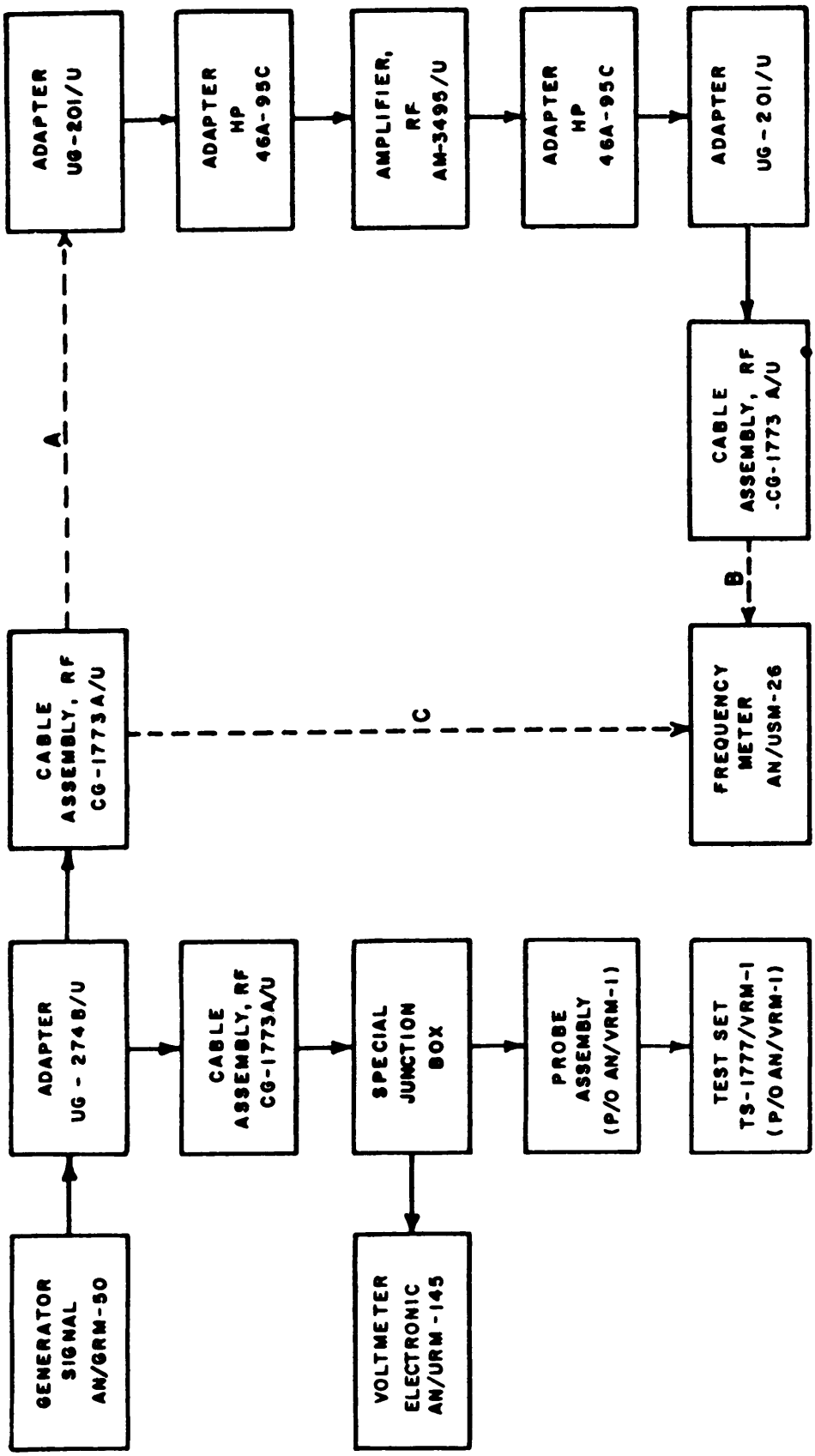


Figure 31.6. (Added) RF voltage tests setup, block diagram.

Caution: **check to be sure that signal voltages are removed from the brfore setting the TS-1777/VRM-1 ON-OFF switch to OFF.**

e. Remove all test connections and turn the power off.

Page 69. Add to the appendix:

TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired signal Equipment.
TM 11-2649	Audio Oscillator TS-421/U (Hewlett-Packard *Model* 205 -AG).
TM 11-5057	Frequency Meter JW/USM-26.
TM 11-6625 - 200-12	Operator and Organizational Maintenance Manual: Multimeters ME-26A/U and ME-26B/U.
TM 11-6625-320-l2	Operator's and Organizational Maintenance Manual: Voltmeter, Meter ME-30A/U and Voltmeter Electronic ME-30B/U and ME-30 C/U.
TM 11-6625-392-12	Operator's and Organizational Maintenance Manual: Test Set, Transponder Set AN/URM-125.
TM 11-6625-436-10	Operator's Manual, Voltmeter, Electronic AN/USM-98.

Page 77, figure 39 (as changed by C 1, 13 January 1964). Make the following changes:

Add to the notes:

6. R7918 (22 OHMS) IS CONNECTED BETWEEN THE PROBE RF OUTPUT AND THE INPUT OF FL7501.

Change the type number of Q7601 from "2N502" to: 2N502B.

Change the type number of Q7702 from "2N502A" to: 2N502B.

Change the values of the following resistors:

R7707. From "1,800" to: 5.6K.

R7914. From "220" to: 402.

R7913. From "113" to: 66.5.

R7911. From "22.1" to: 84.5.

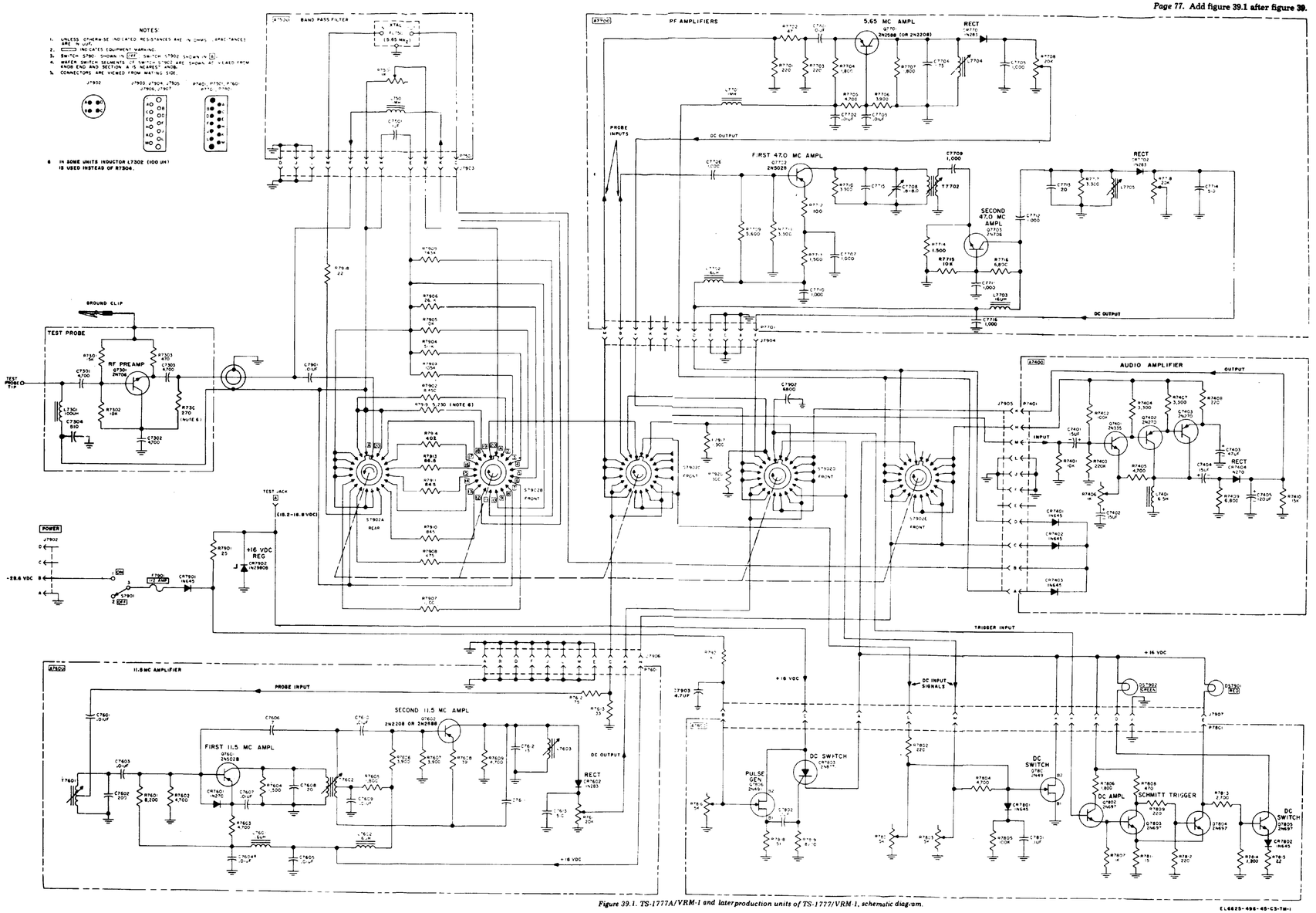
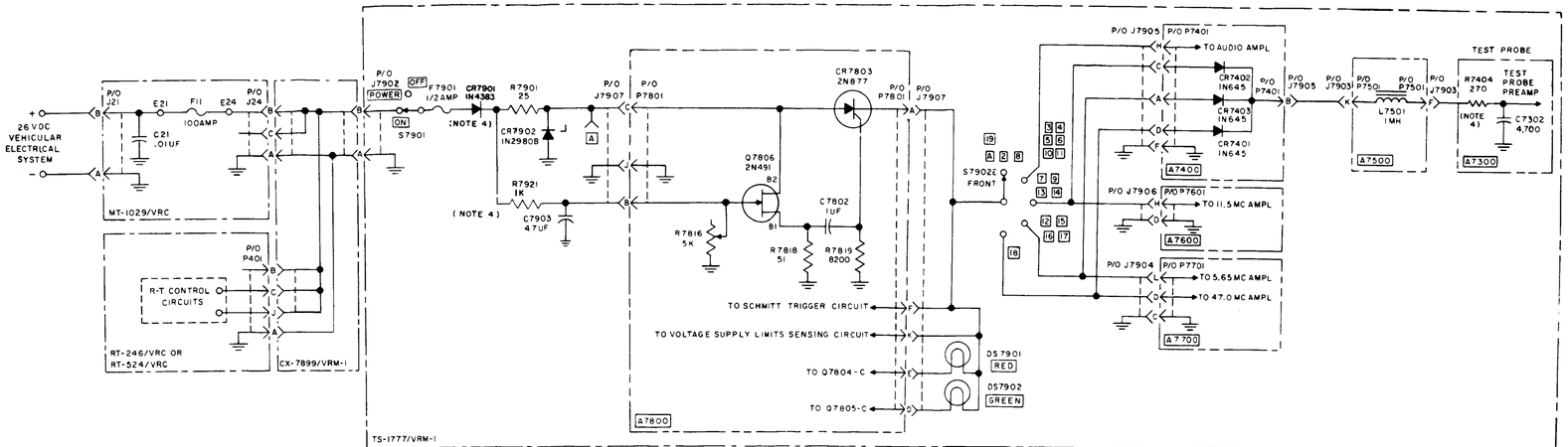


Figure 39.1. TS-1777A/VRM-1 and later production units of TS-1777/VRM-1, schematic diagram.

EL6625-496-45-C3-TM-1



NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS; CAPACITANCES ARE IN UUF.
2. [ ] INDICATES EQUIPMENT MARKING.
3. SWITCH S7901 SHOWN IN [ON]; S7902 SHOWN IN [A]
4. IN SOME UNITS! INDUCTOR L7302 (100UH) IS USED INSTEAD OF R7304; R7901 IS 43 OHMS; R7921 AND C7903 ARE NOT USED IN PATH BETWEEN CR7901 AND PIN B OF J7907. **ALSO, IN UNITS BEFORE 1975, CR7901 IS TYPE IN645.**

EL4YC006

Figure 38.2 TS-1777A/VRM-1 and later production units of TS-1777A/VRM-1, power distribution diagram.

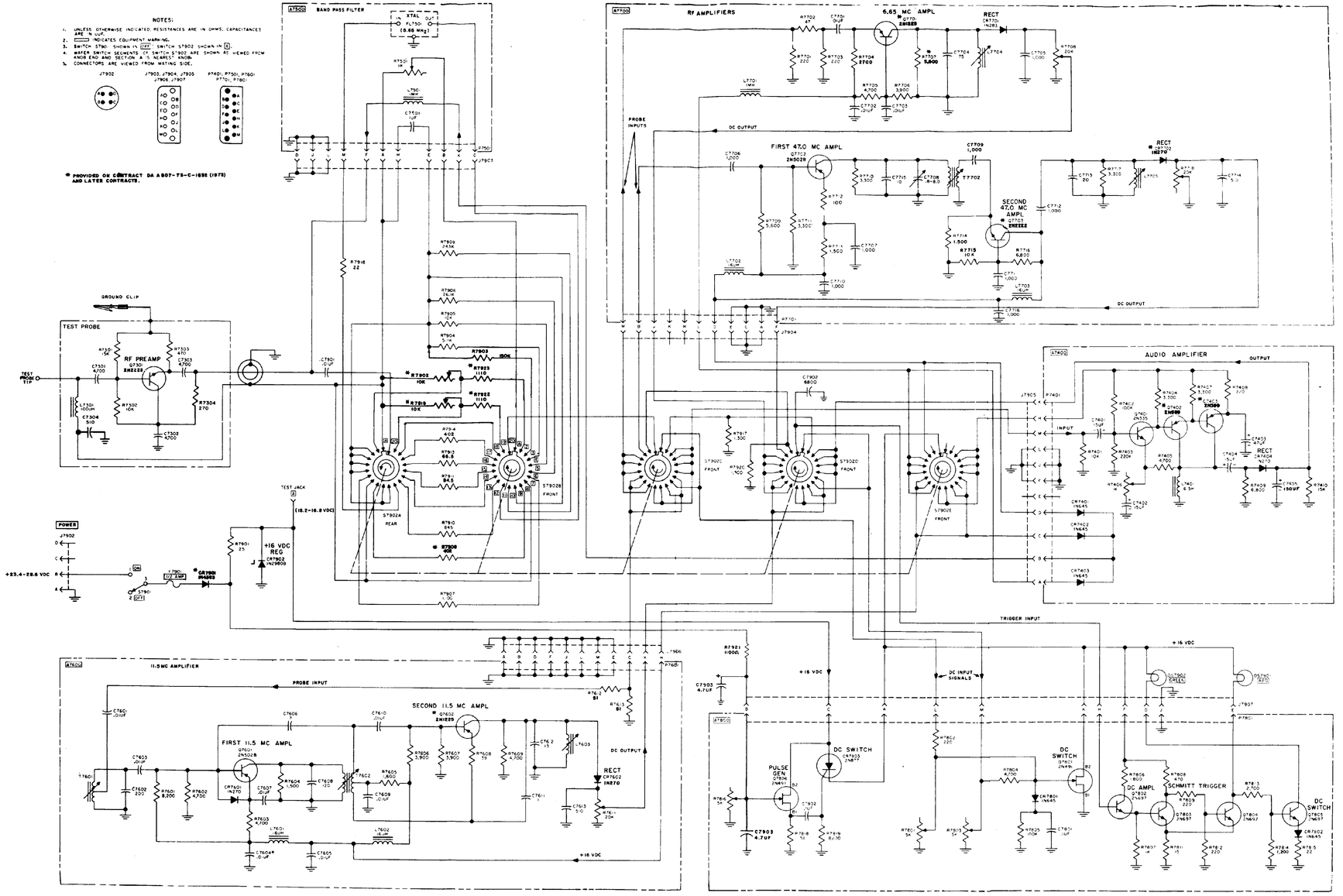


Figure 39.2. TS-1777A/VRM-1 schematic diagram.

Add figure 38.1 after figure 38.

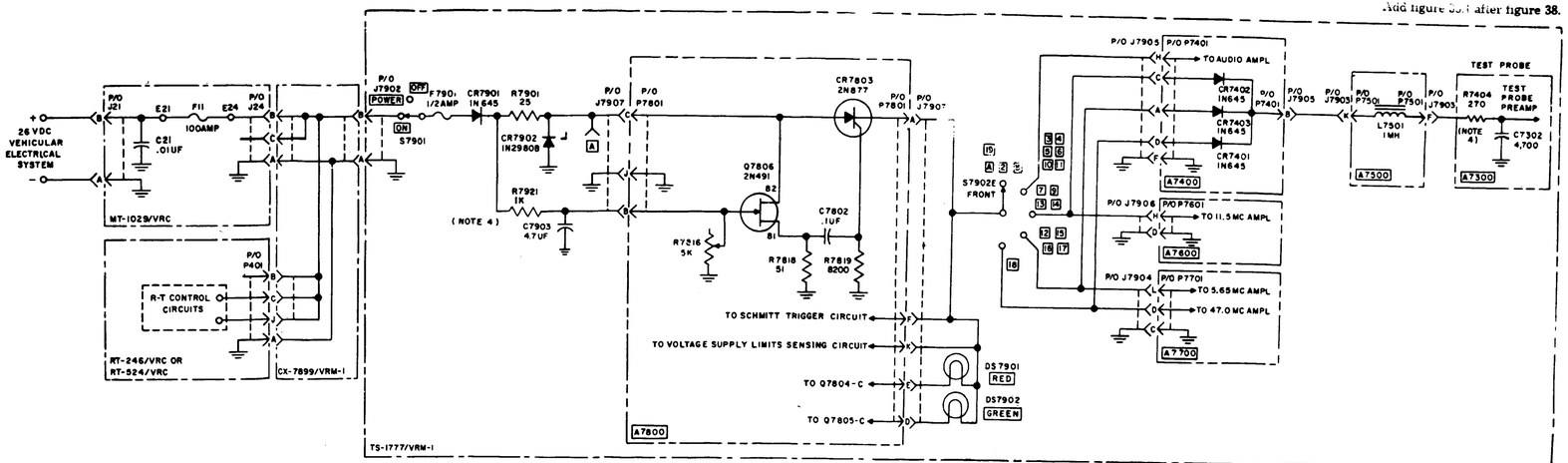


Figure 38.1. TS-1777A/VRM-1 and later production units of TS-1777/VRM-1, power distribution diagram.

NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS; CAPACITANCES ARE IN UUF.
2. ▭ INDICATES EQUIPMENT MARKING.
3. SWITCH S7901 SHOWN IN [ON]; S7902 SHOWN IN [A]
4. IN SOME UNITS: INDUCTOR L7302 (100UH) IS USED INSTEAD OF R7304; R7901 IS 43 OHMS; R7921 AND C7903 ARE NOT USED IN PATH BETWEEN CR7901 AND PIN B OF J7907.

EL6625-496-45-C3-TM-3

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
***Major General,* United States Army**
The Adjutant General.

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MDW (1)
USATC AD (2)
USATC Armor (2)
USATC Engr (2)
USATC Inf (2)
USASTC (3)
Instl (2) except
Ft Monmouth (63)
Ft Gordon (5)
Ft Huachuu (10)
GENDEP (OS) (2)
Sig Sec GENDEP (5)
Sig Dep (OS) (12)
Army Dep (2) except
Lexington (12)
Sacramento (23)
Tobyhanna (12) .
Ft Worth (8)
Letterkenny (5)
Sharpe (8)
Savanna (5)
Navajo (5)
Charleston (3)
Svc Colleges (2)
Br Svc Sch (2)
WRAMC (2)
US Army Tml (1) except Oakland (5)
POE (1)
AMS (1)
Army Pic Cen (2)
USATTCARC (1)
USATTCA (1)
USATTCG (1)
USATTCP (1)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (9)
Chicago Proc Dist (1)
Sig Fld Maint Shops (3)
USAERDL (2)
USAERDLA (White sands) (13)
USAELRDL Trp Cored (10)
USAARMBD (2)
US-4 Trans Bd (2)
USAARTYBD (2)
USA Corps (3)
WSMR (5)
11th Air Assult Div (3)
USA Cold Regions RE Lab (2)
Units org under fol TOE: 2 ea. UNOINDC

11-16	11-500 (AA-AE) (4)
11-57	11-557
11-98	11-587
11-117	11-592
11-155	11-597
11-157	

NG: State AG (3).
USAR: None.

For explanation of abbreviations used, see AR 320-50.

Technical Manual
No. 11-6625-496-45

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *3 July 1962*

TEST SET, RADIO AN/VRM-1

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CHAPTER 1

THEORY

1. Scope

a. This manual covers field (fourth echelon) and depot mainteriance for Test Set, Radio AN/VRM-l. It includes instructions appropriate to fourth and fifth echelon for troubleshooting, testing, aligning, and repairing the equipment. Detailed functions of the AN/VRM-1 are covered in this chapter.

b. The complete technical manual for this equipment includes TM 11-6625-496-12, TM 11-6625-496-20P. and TM 11-6625-45P.

c. Forward comments concerning this manual to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS-MPP-4, Fort Monmouth, N.J.

Note: For applicable forms and records, refer to paragraph 2, TM 11-6625-496-12.

d. Refer to DA Pamphlet 310-4 to determine what Changes to or revisions of this publication are current.

2. Block Diagram

(fig. 37)

Test Set, Radio AN/VRM-1 is a portable equipment for testing plug-in modules of Receiver, Radio R-442/VRC and Receiver-Transmitters, Radio RT-246/VRC and RT-524/VRC. Signal paths are shown in the block diagram and are discussed in a through c below. The complete circuit is shown in the overall schematic diagram (fig. 39).

a. Selector Witch. The setting of the 20-position selector switch, S7902, is determined by the type of test to be made. The routing of the voltages under test is determined by the selector switch position.

b. Rf Signals. The radiofrequency (rf) signals under test are amplified by the test probe rf amplifier and routed by S7902A to the 5.65-mc filter, to an appropriate attenuator network, or directly to S7902B and S7902C. The latter switch sections apply the signal to one of three rf amplifiers: 11.5-megacycle (mc), 5.65-mc, or 47. O-mc. The amplified signals are rectified and applied through S7902D to the Schmitt trigger circuit *(e* below).

c. Audio signals. The audio signals from the test probe are routed by S7902B or S7902C either through an appropriate attenuator network or directly to the audio amplifier. The amplified signal is rectified and applied through S7902 D to the Schmitt trigger circuit (e below).

d. Dc Voltages. The dc voltages under test are routed either through an appropriate attenuator or directly to S7902B or S7902C. The latter switch sections apply the voltage to either the voltage divider or the voltage supply limits sensing circuit. The voltage supply limits sensing circuit senses whether the voltage under test is between minimum and maximum tolerances. The direct-current (de) voltage from the voltage divider or voltage supply limits sensing circuit is connected through S7902D to the Schmitt trigger circuit (e below).

e. Schmitt Trigger. The Schmitt trigger circuit operates in conjunction with two indicator lamps. In the absence of a signal or when a signal is not within tolerances, the RED indicator lamp lights. When a signal is within tolerances, the GREEN indicator lamp lights.

f. Power. Power is supplied to the TS-1777/VRM-l from a 26-volt dc power source, such as a vehicle electrical system. The power source is connected to a 16-volt dc regulator circuit and a line voltage sensing circuit. The output of the 16-volt dc regulator circuit is connected to the line voltage sensing circuit. When the power source voltage is above 22 volts dc (minimum limit), the output of the 16-volt dc regulator is switched by the line voltage sensing circuit to the indicator lamps, the Schmitt trigger circuit, the voltage supply limits sensing circuit, and

S7902E. The 16 volts dc is supplied to the audio amplifier or one of the rf amplifiers and the test probe rf preamplifier from S7902E.

3. Audio Amplifier
(fig. 1)

The audio amplifier is a three-stage, direct-coupled, class A amplifier. Power, input, and output connections to the audio amplifier are completed when the selector switch S7902 is in position 3, 4, 5, 6, 10, or 11. The output from the audio amplifier is rectified and fed to the Schmitt trigger circuit.

a. The input signal to the audio amplifier, developed across resistor. R7401, is coupled through capacitor C7401 to the base of transistor Q7401. The amplified output at the collector of transistor Q7401 is directly coupled to the base of transistor Q7402. Resistors R7402 and R7403 form a voltage divider which develops the emitter-base bias for transistor Q7401. Resistor R7404 is the output load resistor in the collector circuit of Q7401.

b. The output at the collector of transistor Q7401 is amplified by transistor Q7402. The output of Q7402 is applied directly to the base of transistor Q7403. Resistor R7407 is the emitter load resistor for transistor Q7402.

c. The voltage divider, network consisting of resistor R7405, potentiometer R7406, and capacitor C7402 develops degenerative alternating-current (at) feedback for these directly coupled amplifier stages. Potentiometer R7406 is a preset control; its setting determines the overall gain of the audio amplifier.

d. Resistor R7408 establishes the self-biasing portion of the emitter-base bias for transistor Q7403. Capacitor C7403 is an audio bypass capacitor. Inductor L7401 is the collector load for transistor Q7403.

e. The output of the audio amplifier is coupled through capacitor C7404 to rectifier CR7404. Resistor R7409 is the diode return resistor, R7410 is the load resistor, and C7405 is the filter capacitor. The dc output from the rectifier circuit is fed to the Schmitt trigger circuit.

4. Amplifier, 11.5-Mc
(fig. 2)

The 11.5-mc amplifier is a two-stage, intermediate-frequency (if.) amp1ifier. The overall gain of the two stages is about 40 decibels (db). Power, input, and output connections to the 11.5-mc amplifier are made when selector switch S7902 is in position 7, 9, 13, or 14. The output from the 11.5-mc amplifier is rectified and fed to the Schmitt trigger circuit.

a. The input signal from the test probe rf preamplifier is limited b y resistor R7612 and coupled to the primary winding of transformer T7601 through capacitor C7601. Resistor R7613 matches the impedance of the test probe rf preamplifier to that of the 11.5-mc amplifier input.

b. First 11.5-mc amplifier Q7601 is connected in a common-emitter amplifier stage which provides about 20-db gain.

(1) Transformer T7601 and capacitor C7602 tune the input to Q7601. The input signal is coupled to the base of transistor Q7601 through capacitor C7603. The output signal from Q7601 is developed across a tuned circuit consisting of the primary winding of transformer T7602 and capacitor C7608. Resistor R7604 reduces the Q of the tuned circuit to provide the proper bandwidth.

(2) Resistors R7601 and R7602 form a voltage divider which provides the fixed-bias portion of the emitter-base bias for Q7601. Resistor R7603 establishes the self-biasing portion of the emitter-base bias and stabilizes the emitter current. Capacitor C7607 is an rf bypass capacitor. Capacitor C7606 neutralizes the first 11.5-mc amplifier. Diode CR7601 prevents the emitter-base bias from reversing when a very large input signal is applied to the stage. Capacitor C7604 and inductor L7601 form a decoupling network in the 16-volt dc supply line.

c. Second 11.5-mc amplifier Q7602 is connected in a common-emitter amplifier *stage* which provides about 20-db gain.

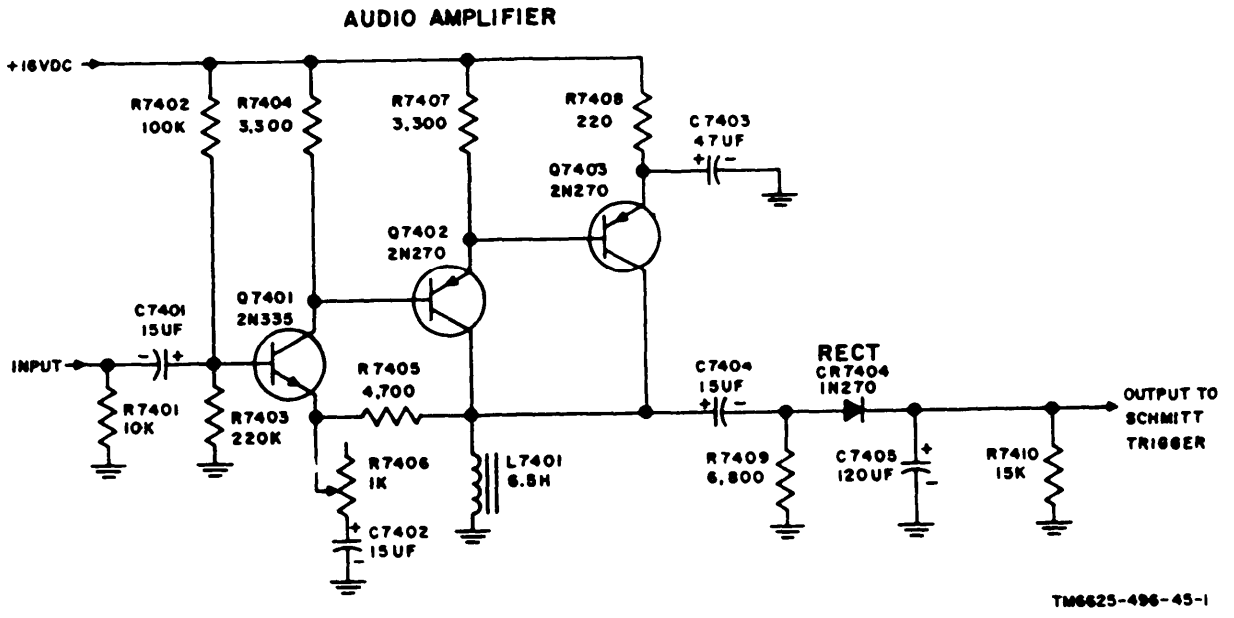


Figure 1. Audio amplifier, schematic diagram.

(1) Transistor Q7602 receives its input from the secondary winding of T7602. The input signal is coupled to the base of transistor Q7602 through capacitor C761O.

(2) The output signal of Q7602 is developed across a tuned circuit *con*sisting of inductor L7603 and capacitor C7612. Resistor R7609 reduces the Q of the tuned circuit to provide the proper bandwidth.

(3) Resistors R7606 and R7607 form a voltage divider which provides the fixed-biasing portion of the emitter-base bias for Q7602. Resistors R7608 and R7605 establish the self-biasing portion of the emitter-base bias and stabilize the emitter current. Capacitor C7609 is an rf bypass capacitor for resistor R7605. Resistor R7608 pro vi d es emitter degeneration which stabilizes the stage. The stage is also stablized by the out-of-phase portion of the signal fed to the emitter of Q7602 from the tapped secondary winding of trans-. former T7602. Capacitor C7611, in conjunction with the bottom half of secondary T7602, neutralizes the second 11.5-mc amplifier. Capacitor C7605 and inductor L7602 form a decoupling network in the +16-volt dc supply line.

d. The output from the second 11.5-mc amplifier is rectified by diode CR7602 and filtered by capacitor C7613. The dc voltage is taken from potentiometer R7611 and fed to the Schmitt trigger circuit. The amount of dc output voltage to the Schmitt trigger can be varied by adjustment of R7611.

5. Filter, 5.65-Mc
(fig. 39)

Filter FL7501 is a bandpass crystal filter having a center frequency of 5.65-mc. The filter is in series with the output of the test probe rf preamplifier circuit when switch S7902 is in position 12. It is a part of assembly A7500. The filter has a minimum bandwidth of 5.4 kilocycles (kc) at the 3-db points, a maximum bandwidth of 6.6 kc at the 6-db points, and a maximum bandwidth of 12.2 kc at the 50-db points. Its input and output impedances are 50 ohms. Its insertion loss at 5.65 mc does not exceed 6db

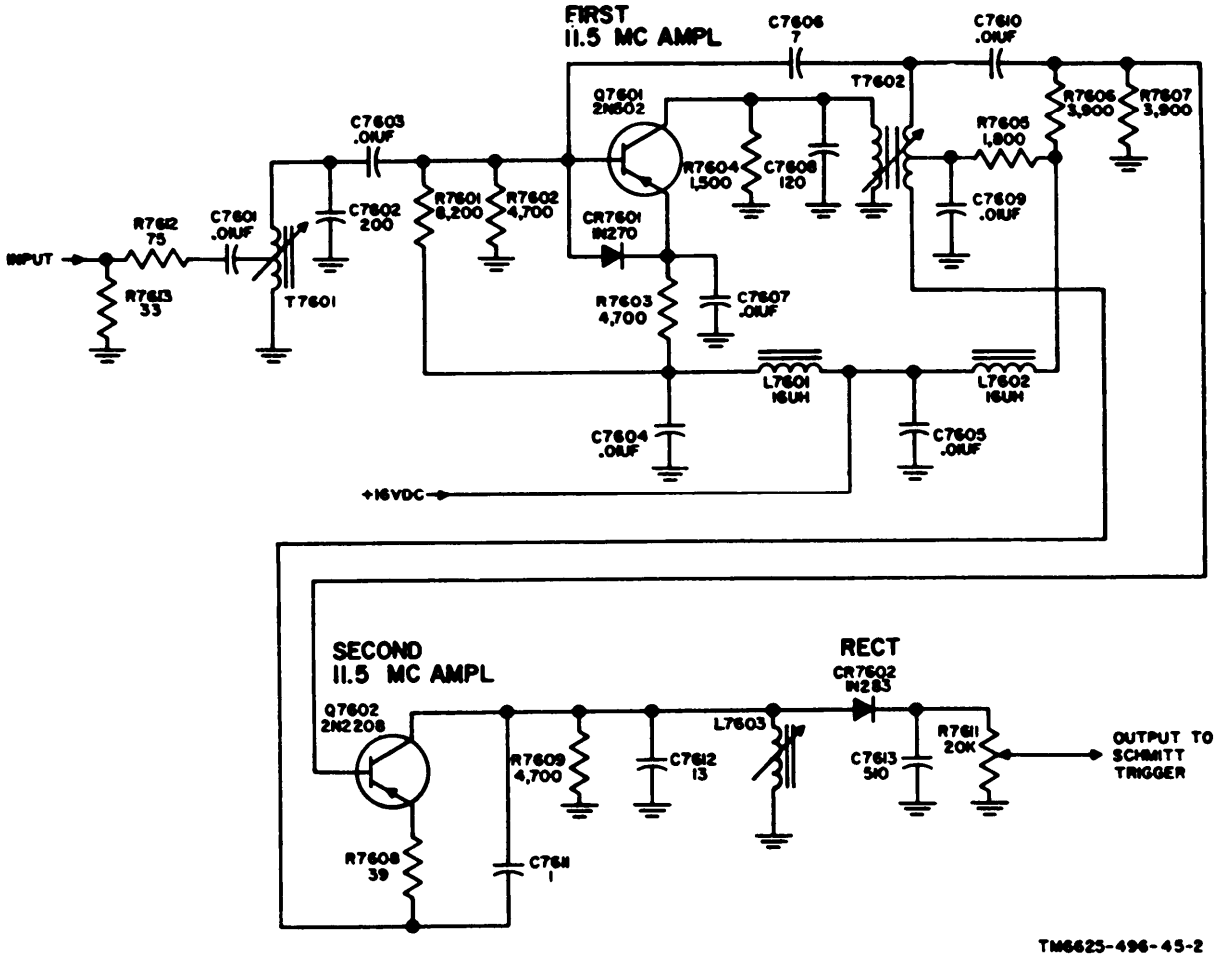


Figure 2. Amplifier, 11.6-mc, schematic diagram.

6. Amplifier, 5.65-Mc (fig. 3)

The 5.65-mc amplifier is a single-stage if. amplifier which has a gain of about 15 db. Power, input, and output connections are made to the 5.65-mc amplifier when selector switch S7902 is inposition 12, 15, 16, or 17. The output from the amplifier is rectified and fed to the Schmitt trigger circuit.

a. The input signal from the test probe rf preamplifier is fed to the input attenuation pad consisting of resistors R7701, R7702, and R7703. The pad reduces the rf signal level and isolates the 5.65-mc amplifier from the test probe rf preamplifier.

b. The 5.65-mc amplifier uses transistor Q7701 in a common-base stage which provides about 15-db gain.

(1) The attenuated signal is coupled to the emitter of transistor Q7701 through capacitor C7701. The output signal of Q7701 is developed across a tuned circuit consisting of coil L7704 and capacitor C7704. Resistor R7707 reduces the Q of the tuned circuit to obtain the proper bandwidth.

(2) Resistors R7705 and R7706 form a voltage divider which provides the fixed-biasing portion of emitter-base bias for Q7701. Resistor R7704 establishes the self-biasing

portion of the emitter-base bias and stabilizes the emitter current. Capacitor C7703 is an rf bypass capacitor. Capacitor C7702 and inductor L7701 form a decoupling network in the +16-volt dc supply line.

c. The output from the 5.65-mc amplifier is rectified by diode CR7701 and filtered by capacitor C7705. The dc output is taken from potentiometer R7708 and fed to the Schmitt trigger circuit. The amount of dc output voltage to the Schmitt trigger can be varied by adjustment of R7708.

7. Amplifier, 47.0-Mc (fig. 4)

The 47.0-mc amplifier is a two-stage rf amplifier. Overall gain of the two stages is about 15 db. Power, input, and output connections to the 47.0-mc amplifier are made when selector switch S7902 is in position 18. The output from the 47.0-mc *amplifier* is rectified and fed to the Schmitt trigger circuit.

a. The first 47.0-mc amplifier uses transistor Q7702 in a common-emitter stage.

(1) The input signal from the test probe of transformer T7702, trimmer capacitor C7708, and fixed capacitor C7715. Resistor R7710 reduces the Q of the tuned circuit to provide the proper bandwidth.

(2) Resistors R7709 and R7711 form a voltage divider which provides the fixed-biasing portion of the emitter-base bias for Q7702. Resistors R7712 and R7713 establish the self-biasing portion of the emitter-base bias and are used for current stabilization. Capacitor C7707 is an rf bypass capacitor across R7713. Since only a portion of the self-biasing network is rf bypassed, the input impedance of Q7702 is effectively raised. Coil L7702 and capacitor C7710 form a decoupling network in the +16-volt dc supply line.

b. The second 47.0-mc amplifier uses transistor Q7703 in a common-base stage.

(1) *The* 'signal appearing at the secondary winding of T7702 is coupled through C7709 to the emitter of Q7703. The output of Q7703 is coupled through C7712 to the tuned output circuit which consists of coil L7705 and capacitor C7713. Resistor R7717 reduces the Q of the tuned circuit to provide proper bandwidth.

(2) Resistors R7716 and R7715 form a

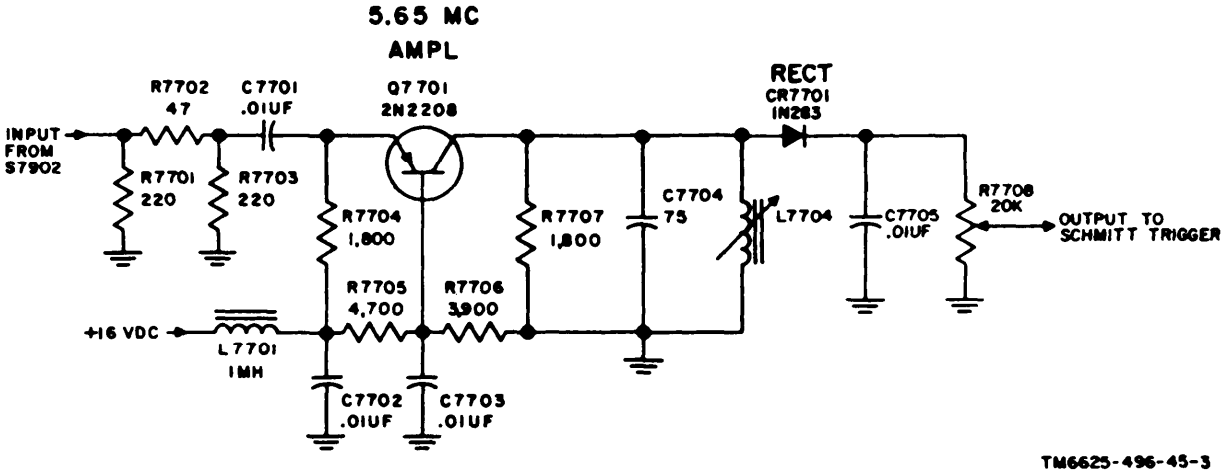


Figure 3. Amplifier, 5.65-mc, schematic diagram.

voltage divider which provides the fixed-hissing portion of emitter-base bias for Q7703. Resistor R7714 develops the self-biasing portion of the emitter-base bias and stabilizes the emitter. Capacitor C7711 places the base of Q7703 at rf ground potential. Capacitor C7716 and inductor L7703 form a decoupling network in the +16-volt dc supply line.

c. The output from the second 47.0-mc amplifier is rectified by diode CR7702. The rectified signal is filtered by capacitor C7714. Part of the dc voltage, as determined by the setting of R7718, is fed to the Schmitt trigger circuit.

8. Test Probe Rf Preamplifier (fig. 5)

The test probe rf preamplifier is a single-stage wide-band rf amplifier which develops a gain of about 1. Power and output connections are made to the test probe rf preamplifier when switch S7902 is in position 7, 9, 12, 13, 14, 15, 16,17, or 18. The output from the test probe rf preamplifier is fed to either the 5.65-mc, 11.5-mc, or the 47.0-mc amplifier, depending on the selector switch position.

a. The test probe rf preamplifier uses transistor Q7301 in an emitter-follower stage.

(1) The input signal from the test probe tip is coupled through capacitor C7301 to the base of Q7301. The output of Q7301 is coupled through C7303 and C7901 to the input of the selected rf amplifier.

(2) Resistors R7301 and R7302 form a voltage divider that provides the fixed-biasing portion of the emitter-base bias for Q7301. Resistor R7303 establishes the self-biasing portion of the collector-base bias and stabilizes the emitter current. Positive voltage is applied to the collector through rf choke L7302. Capacitor C7302 is an rf bypass capacitor for the collector of Q7301.

b. Power to the test probe rf preamplifier Is supplied from the +16-volt dc supply line as selected by switch S7902. Inductor L7501 keeps rf *voltages out of the supply line. Diode* CR7401 is associated with the

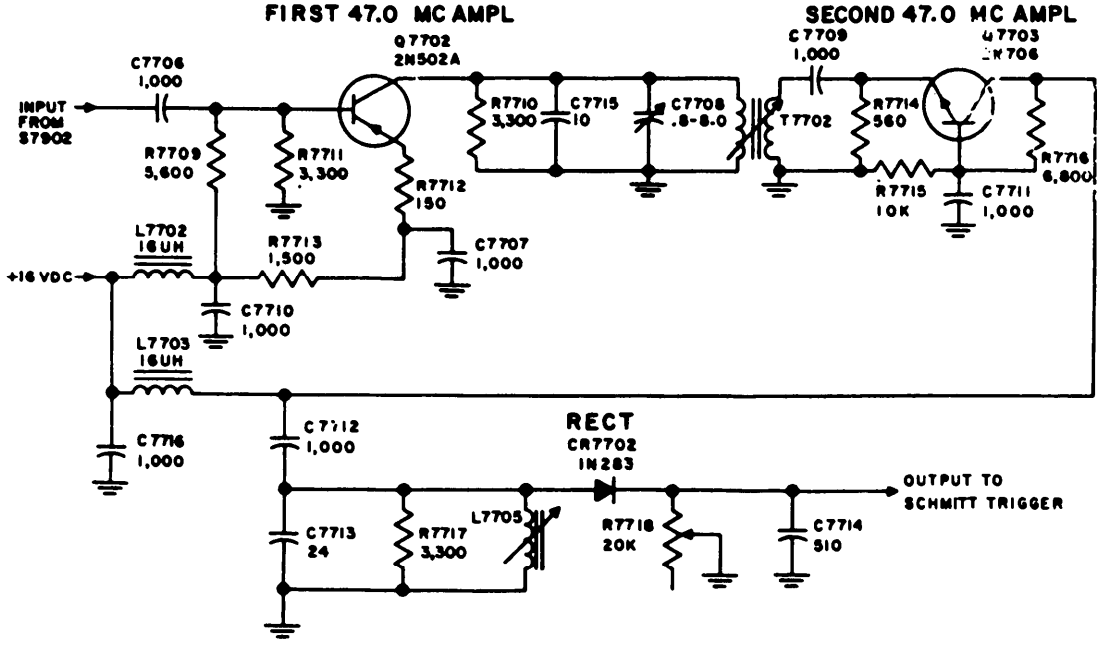


Figure 4. Amplifier, 47.0-mc, schematic diagram.

47.0-mc amplifier; diode CR7402, with the 11.5-mc amplifier; and diode CR7403, with the 5.65-mc amplifier. The diode associated with the rf amplifier in use conducts to allow +16 volts to be supplied to the test probe rf preamplifier. The two diodes associated with the two rf amplifiers not in use prevent the supply voltage from being fed to the amplifiers from their common connection in the test probe rf preamplifier supply line.

9. Voltage Supply Limits Sensing Circuit (fig. 6)

The voltage supply limits sensing circuit consists of two voltage dividers and a dc switch. It senses the minimum and maximum limits of regulated +16- and +12-volt dc supplies. Power, input, and output connections are made to the voltage supply limits sensing circuit when switch S7902 is in position A or 8. The dc output of the voltage supply limits sensing circuit is fed to the Schmitt trigger circuit.

a. The voltage divider network consisting of resistor R7902 and rheostat R7801 and the network of resistor R7804 and rheostat R7803 sense the minimum voltage supply limit. Rheostat R7803 is adjusted so that at the minimum allowable level, sufficient voltage is applied to the Schmitt trigger circuit to cause it to go from its RED (bad) condition to its GREEN (good) condition.

b. The voltage divider consisting of resistor R7802 and rheostat R7801 and dc switching transistor Q7801 sense the maximum voltage supply limit. Transistor Q7801 is a unijunction transistor. With the Schmitt trigger circuit in its GREEN condition, the +16 volta dc applied to base B2 of transistor Q7801 biases the transistor to cutoff. If the voltage applied to the divier of resistors R7801 and R7802 exceeds the maximum limit, the voltage applied at the emitter of transistor Q7801 overcomes the +16-volt bias and is connected through base Bl to _ground, and transistor Q7801 is biased into conduction. This action quickly reduces the voltage applied to the Schmitt trigger circuit below the minimum required to operate it, and the Schmitt trigger circuit returns to its RED (bad) condition.

c. When the test probe tip is first applied to a test point, a transient voltage can be applied to the voltage supply limits sensing circuit which could cause Q7801 to be biased into conduction even though the voltage being tested is quite lox. The network of diode CR7801, load resistor R7805, and filter capacitor C7801 reduces such transient voltages by providing a relatively

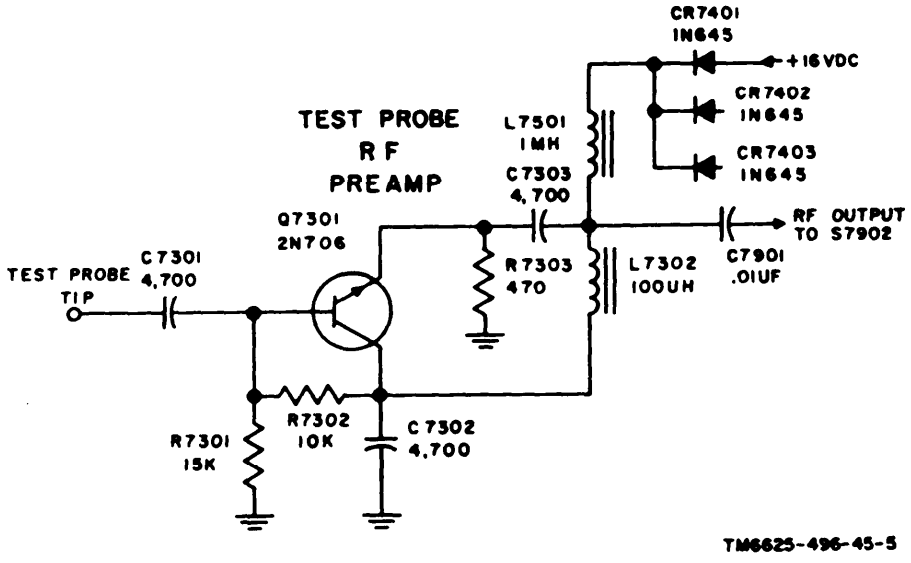


Figure 5. Test probe rf preamplifier, schematic diagram.

low-resistance path to them. When transistor Q7801 is biased into conduction, it provides a much lower path to ground than the diode network, and the diode network is effectively removed from the circuit.

10. Schmitt Trigger Circuit
(fig.7)

The Schmitt trigger circuit consists of a dc amplifier, a Schmitt trigger, a dc switch, and a pair of indicator lamps. The circuit is used in all positions of selector switch S7902.

a. Transistor Q7802 is an emitter-follower, dc amplifier. Transistors Q7803 and Q7804 form the schmitt trigger. Transistor Q7805 is used as a dc switch.

b. In the absence of an input signal (de) or when a small input signal is present, transistor Q7804 conducts and transistors Q7802, Q7803, and Q7805 are cut off. Transistor Q7804 conducts and a relatively low-resistance path to ground is established through R7811, Q7804, and RED indicator 1amp DS7902, causing lamp DS7902 to light.

C. When a large input signal (de) is applied to the base of Q7802, the transistor s biased into conduction. Since the base of Q7803 in the Schmitt trigger is directly connected to the emitter of Q7802, transistor Q7803 is also biased into conduction. When Q7803 conducts, the voltage at the base of Q7803 decreases. This decreased voltage, which is applied to the base of Q7804 through R7809, causes Q7804 to cut off. When transistor Q7804 is cut off, the voltage at the base of dc switching transistor Q7805 is increased. Transistor Q7805 starts conducting and causes a relatively low resistance path to ground through R7815, CR7802, Q7805, and GREEN indicator lamp DS7901 and causes DS7901 to light.

d. Resistors R7806 and R7808 and lamps DS7902 and DS7901 are the collector loads for Q7802 through Q7805 respectively. Resistor R7807 is the emitter-base bias resistor for Q7802. Resistor R7811 establishes the emitter bias for Q7803 and Q7804. Resistors R7809 and R7812 establish the base bias for Q7804, and R7813 and R7814 establish the base bias for Q7805. Resistor R7815 establishes the emitter bias for Q7805. Diode CR7802 prevents any small signal present at the base of transistor Q7805 from biasing the transistor into conduction while Q7804 is *conducting.* When Q7805 is conducting, diode CR7802 presents a very small impedance to the current.

11. Line Voltage Sensing Circuit
(fig. 8)

The line voltage sensing circuit consists of a voltage *divider,* a pulse generator, and a dc switch which senses the minimum limit of the power source voltage for the TS-1777/VRM-l. The circuit is used whenever power is applied to the TS-1777/ VRM-1.

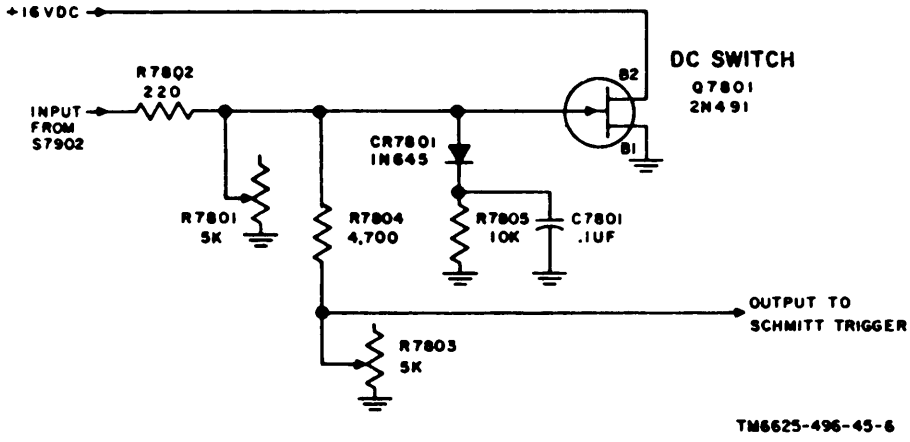


Figure 6. Voltage supply limits sensing circuit, schematic diagram.

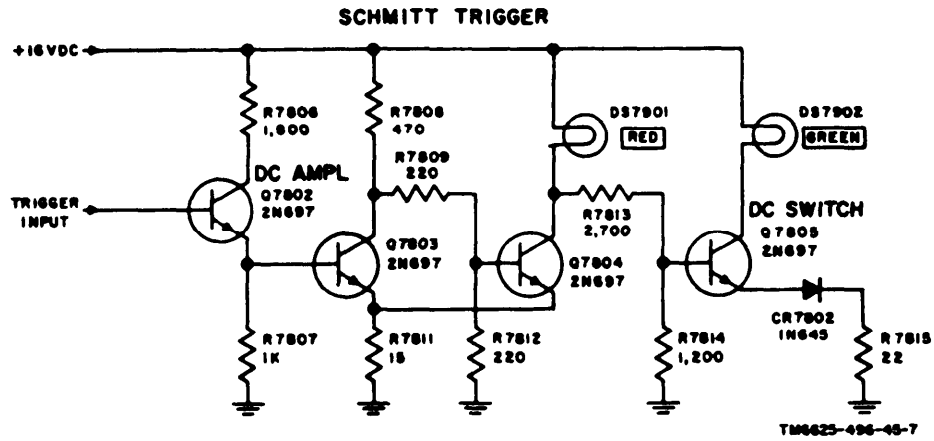


Figure 7. Schmitt trigger circuit, schematic diagram.

a. Resistor R7817 and rheostat R7816 form a voltage divider. Rheostat R7816 is adjusted SO that the minimum source voltage will cause the line voltage sensing circuit to function. Transistor Q7806 is a unijunction transistor. *When the* power source voltage is below minimum, the +16 volts dc applied at base B2 of Q7806 biases it to cutoff. If the power source voltage reaches or exceeds the minimum, the voltage applied at the emitter of Q7806 overcomes the +16-volt bias and there will be conduction through base B2 and load resistor R7818 to ground.

b. At the instant Q7806 conducts, a sharp positive-going pulse is generated at B1. The pulse is coupled through capacitor C7802 to the gate of dc switch CR7803. DC switch CR7803 is cut off until a positive pulse is applied to its gate. Since CR7803 is in series with the +16-volt dc supply line, operation of the TS-1777/VRM-l is not possible until Q7806 generates a pulse large enough to operate the gate of CR7803. Resistor R7819 is the dc return resistor for the gate circuit.

12. Power Distribution
(fig. 38)

Test Set, Radio AN/VRNI-l is supplied 26.0 volts dc from a power source such as a vehicular electrical system. The CX-7899/VRM-1 connects the power from an MT-1029/VRC or MT-1898/VRC to the TS-1777/VRM-l and to the R-442/VRC, RT-246/VRC, or RT-524/VRC under test. Figure 38 is a simplified power distribution diagram of a typical test setup for an RT-246/VRC or RT-524/VRC. The setup for testing an R-442/VRC is similar except that an MT-1898/VRC is used instead of an MT-1029/VRC .

a. The negative terminal of the vehicular electrical system is connected to ground in the MT-1029/VRC through terminal A of J21. The positive terminal is connected to terminal B of connector J21 on the MT-1029/VRC; through fuse Fll to terminal B of connector J24. The positive voltage is connected by the CX-7899/VRM-l to terminals B, C, and J of connector P401 *on the* RT-246/VRC or RT-524/VRC to provide power and control voltage for the equipment under test. The positive voltage is also connected by the CX-7899/VRM-l to terminal B of POWER connector J7902 on the TS-1777/VRM-l.

b. When switch S7901 is ON, positive voltage is applied through fuse F7901 and diode CR7901. Fuse F7901 protects the TS-1777/VRM-l and associated equipment. Diode CR7901 prevents possible damage to the TS-1777/VRM-l if power of improper polarity is accidentally applied to connector J7902. The positive voltage appearing at diode CR7901 is applied to voltage dropping resistor R7901 and breakdown diode CR7902, which form a +16-volt dc regulator. The regulated +16 volts dc is applied to terminal C of connectors J7907 and P7801. The voltage at

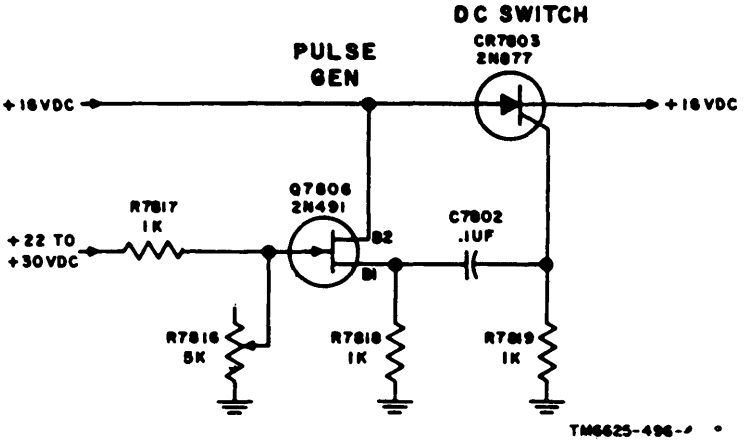


Figure 8. Line voltage sensing circuit, schematic diagram.

diode CR7901 is also applied through terminal B of connectors J7907 and P7801 to the line voltage sensing circuit consisting of resistors R7817, R7818, and R7819, rheostat R8716, capacitor C7802, unijunction transistor Q7806, and dc switch CR7803. The operation of this circuit is explained in paragraph 11.

c. If tie power source voltage is above its minimum limit of +22 volts dc, +16 volts dc is applied through terminal A of connectors P7801 and J7907 to the following places:

(1) Terminal F of connectors J7907 and P7801 to supply power for the Schmitt trigger circuit.

(2) Terminal K of connectors J7907 and P7801 to supply power to the voltage supply limits sensing circuit.

(3) One side of RED indicator lamp DS7901 and GREEN indicator lamp DS7902. The other sides of the lamps are connected through terminals E and D of connectors J7907 and P7801 to the collectors of transistors Q7804 and Q7805, respectively, in the Schmitt trigger circuit.

(4) Switch S7902E.

(a) In positions A, 2, and 8. No connections are made.

(b) In positions 3,4,5,6, *10, and 11.* A connection is made through terminal H of connectors J7905 and P7401 to supply power to the audio amplifier

(c) In Positions 7, 9, 13, and 14 Connections are made through terminal H of connectors J7906 and P7601 to supply power to the 11.5-mc amplifier and through terminal C of connectors J7905 and P7401 to diode CR7402 .

(d) In positions 12, 15, 16, and 17. Connections are made through terminal L of connectors J7904 and P7701 to the 5.65-mc amplifier and through terminal A of connectors J7905 and P7401 to diode CR7403.

(e) In position 18. Connections are made through terminal D of connectors J7904 and P7701 to the 47.0-mc amplifier and through terminal D of connectors J7905 and P7401 to diode CR7401.

d. When +16 volts dc is applied to diode CR7401, CR7402, or CR7403, it is fed through terminal B of connectors P7401 and J7905 and through terminal K of connectors J7903 and P7501. The voltage is applied through inductor L7501, through terminal F of connectors P7501 and J7903, through inductor L7302 and across filter capacitor C7302 to supply power to the test probe rf preamplifier.

13. Selector Switch Position A (A, fig. 9)

When the selector switch is in position A, either a +16-volt dc point on the unit

under test or the TS-1777/VRM-l 16-volt line can be tested.

a. When the TS-1777/VRM-l 16-volt line is tested, the test probe tip is inserted in test jack A. The regulated output of the +16-volt dc regulator circuit is applied through rf choke L7301 and level-adjusting rheostat R7501 to the voltage supply limits sensing circuit. The output from this circuit is applied to the Schmitt trigger circuit. If the regulated voltage is within limits, GREEN indicator lamp. D67902 lights. If the regulated voltage is not within the minimum and maximum limits, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator lamp DS7901 lights. The voltage supply limits sensing and Schmitt trigger circuits are supplied from the +16-volt dc regulated line.

b. When a +16-volt dc point is tested in a unit under test, the test probe tip is inserted in the appropriate test point (A2100-6, TP3002, TP3005, TP3012, TP4006, TP4008, TP5010, or TP8001). The test voltage is then connected through rf choke L7301 and the remainder of the test circuit functions as described in a above.

14. Selector Switch Position 2
(B, fig. 9)

When the selector switch is in position *2,* a +25.5-volt dc point on the unit under test can be tested. The test voltage is connected through rf choke L7301 and across voltage divider network consisting of resistors R7902 and R7917 to the Schmitt trigger circuit. If the test voltage is above the minimum limit, GREEN indicator DS7902 will light. If the test voltage is below the minimum limit, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator DS7901 will light. Operating voltage for the Schmitt trigger circuit is supplied from the +16-volt dc regulated line.

15. Seiector Switch Position 3
(C, fig. *9)*

When the selector switch is in position 3, the 150-cycle-per-second (cps) output of module A5200 can be tested. The signal is connected through inductor L7301, coupling capacitor C7503, and attenuating resistor R7903 to the audio amplifier. The rectified output of the audio amplifier is applied to the Schmitt trigger circuit. If the signal voltage is above the minimum limit, GREEN indicator DS7902 will light. If the signal voltage is below the minimum limit, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator DS7901 will light. The operating power to the audio amplifier and Schmitt trigger circuit are supplied from the +16-volt dc regulated line.

16. Selector Switch Positions 4, 5, and 6
(c, fig. *9)*

a. Position 4. When the selector switch is in position 4, the audio output from module A5100 can be tested. Operation of the circuit is similar to that of position 3 (para 15) except that resistor R7904, which has a resistance of 511K ohms, is used in place of R7903.

b. Position 5. When the selector switch is in position 5, the audio output of module A4300 or A5200 can be tested. Operation of the circuit is similar to that of position 3 (para 15) except that resistor R7905, which has a resistance of 10K ohms, is used in place of R7903.

c. *Position 6.* When the selector switch is in position 6, the audio output of the module A5100 monitor amplifier or a sawtooth output from module A8400 can be tested. Operation of the circuit is similar to that of position 3 (para 15) except that resistor R7906, which has a resistance of 26.lK ohms, is used in place of R7903.

17. Selector Switch Position 7
(D, fig. 9)

When the selector switch is in position 7, the 11.5-mc output of a module A8300 can be tested. The test signal from the test probe rf preamplifier is connected through coupling capacitor *C7901* and attenuating resistor R7907 to the 11.5-mc amplifier. The rectified output of the 11.5-mc amplifier is applied to the Schmitt trigger circuit. If the signal voltage is above the

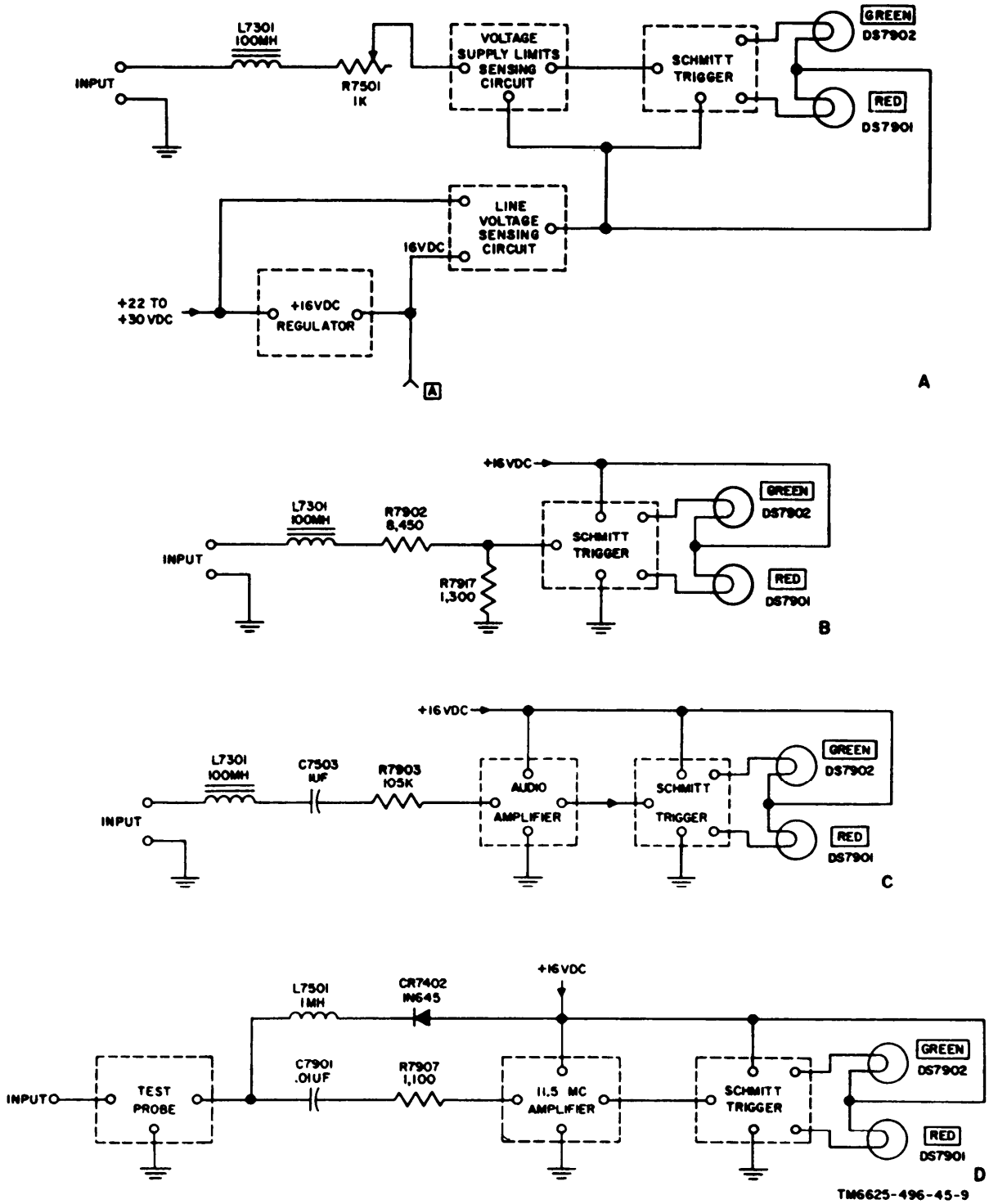


Figure 9. Tests in selector switch positions A, 2, 3, and 7, simplified schematic diagram.

minimum limit, GREEN indicator DS7902 will light. If the signal voltage is below the minimum limit, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator DS7901 will light. Operating voltages are supplied to the 11.5-mc amplifier and Schmitt trigger circuit from the +16-volt dc regulated line. Operating voltage is supplied to the test probe rf preamplifier from the +16-volt dc regulated line through diode CR7402 and rf choke L7501.

18. Selector Switch Position 8
(A, fig. 10)

When the selector switch is in position 8, a. +12-volt dc point on assembly A8000 can be tested. The tested voltage is connected through rf choke L7301 to the voltage supply limits sensing circuit. The output from the voltage supply limb sensing circuit is applied to the Schmitt trigger circuit. If the tested voltage is within limits, GREEN indicator DS7902 will light. If the tested voltage is not be*tween minimum and* maximum limits, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator DS7901 will light. Operating voltages are supplied to the voltage supply limits sensing and Schmitt trigger circuits from the +16-volt dc regulated line.

19. Selector Switch Position 9
(D, fig. 9)

When the selector switch is in position 9, the ll.5-mc output of module A8100 can be tested. The operation is similar to that of position 7 (para 17) except that resistor R7908, which has a resistance of 475 ohms, is used in place of R7907.

20. Selector Switch Position 10
(c, fig. 9)

When the selector switch is in position 10, the audio input to module A5100 can be tested. The operation is similar to that *of* position 3 (para 15) except that R7903 is not used (shorted).

21. Selector Switch Position 11
(c, fig. 9)

When the selector switch is in position 11, the high-level audio output from module A5100 can be tested. The operation is similar to that of position 3 (para 15) except that resistor R7909, which has a resistance of 243K, is used in place of R7903.

22. Selector Switch Position 12
(C, fig. 10)

When the selector switch is in position 12, the 5.65-mc output of module A3500 can be tested. The signal from the test probe rf preamplifier is fed through coupling capacitor C7901 and 5.65-mc filter FL7501 to the 5.65-mc amplifier. The rectified output of the 5.65-mc amplifier is applied to the Schmitt trigger circuit. If the signal voltage is above the minimum limit, GREEN indicator DS7902 will light. If the signal voltage is below the minimum limit, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator DS7901 will light. Operating voltage for the 5.65-mc amplifier and Schmitt trigger circuit is supplied from the +16-volt de regulated line. Operating voltage for the test probe rf preamplifier is supplied from the +16-volt dc regulated line through diode CR7403 and rf choke L7501.

23. Selector Switch Position 13
(D, fig. 9)

When the selector l switch is in position 13, the limited 11.5-mc output of module A4200 can be tested. The operation is similar to that of position 7 (para 17) except that resistor R7901, which has a resistance of 845 ohms, is used in place of R7907.

24. Selector Switch Position 14
(D, fig. 9)

When the selector switch is in position 14, the output of module A3100 can be tested. The operation is similar to that of position 7 (para 17) except that R7907 is not used (shorted).

25. Selector Switch Position 15
(D, fig. 10)

When the selector switch is in position 15, the 5.65-mc output of module A3500 can be tested. The signal from the test

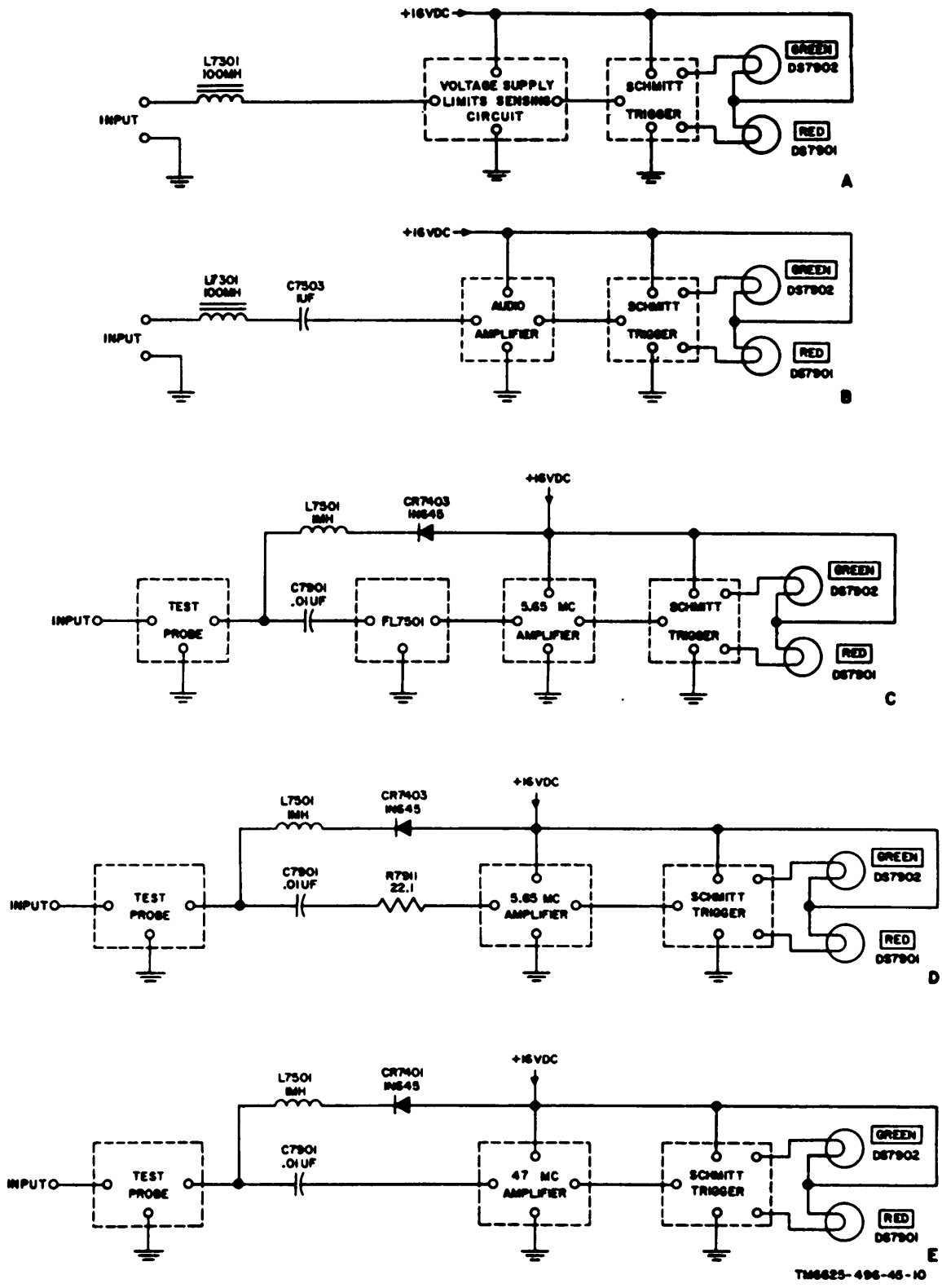


Figure 10. Tests in selector switch positions 8, 12, 13, 16, and 18 simplified schematic diagram.

probe rf preamplifier is fed through coupling capacitor C7901 and attenuating resistor R7911 to the 5.65-mc amplifier. The rectified output of the 5.65-mc amplifier is applied to the Schmitt trigger circuit. If the signal voltage is above the minimum limit, GREEN indicator DS7902 will light. If the signal voltage is below the minimum limit, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator D67901 will light. Operating voltage for the 5.65-mc amplifier and Schmitt trigger circuit is supplied from the +16-volt dc regulated line. Operating voltage for the test probe rf preamplifier is supplied from the +16-volt dc regulated line through diode CR7403 and rf choke L7501.

26. Selector Switch Positions 16 and 17 (D, fig. 10)

a. Position 16. When the selector switch is in position 16, the 5.65-mc output of module A3400 can be tested. The operation is similar to that of position 15 (para 25) except that R7913, which has a resistance of 113 ohms, is used in place of R7911.

b. Position 17. When the selector switch is in position 17, the 5.65-mc output of module A3500 or the 5.65-mc input to module A3600 can be tested. The operation is similar to that of position 15 (para 25) except that R7914, which has a resistance of *200 ohms, is used in place* of R7911.

27. Selector Switch Position 18 (E, fig. 10)

When the selector switch is in position 18, the output of assembly A1000 can be tested. The signal from the test probe rf preamplifier is fed through coupling capacitor C7901 to the 47.0-mc amplifier. The rectified output of the 47.0-mc amplifier is applied to the Schmitt trigger circuit. If the signal voltage is above the minimum limit, GREEN indicator DS7902 will light. If the signal voltage is below the minimum limit, insufficient voltage will be applied to the Schmitt trigger circuit, and RED indicator DS7901 will light. Operating voltage for the 47.0-mc *amplifier* and Schmitt trigger circuit is supplied from the +16-volt dc regulated line. Operating voltage for the test probe rf preamplifier is supplied from the +16-volt dc regulated line through diode CR7401 and rf choke L7501.

CHAPTER 2

FOURTH ECHELON MAINTENANCE

Section I. GENERAL TROUBLESHOOTING TECHNIQUES

Warning: When servicing the TS-1777/VRM-1, be careful when working near power connections. Injury may result from contact with these connections.

28. General Instructions

Troubleshooting of Test Set, Radio AN/VRM-1 at the fourth echelon includes all the techniques outlined for organizational maintenance and additional techniques required to localize troubles to a particular plug-in assembly board to isolate a defective part on the front panel and the selector switch. These fourth echelon procedures are not complete in themselves but supplement the procedures described in TM 11-6625-496- 12. The systematic troubleshooting procedure, which begins with the operational and equipment performance checklists that can be performed at the organizational level, must be completely by means of localizing and isolating techniques. Paragraphs 31 through 34 provide localizing and isolating techniques for use by fourth echelon personnel. Paragraphs 35 through 40 provide detailed repair instructions, and paragraphs 41 and 43 contain a procedure for the overall adjustment of the AN/VRM-l.

29. Organization of Troubleshooting Procedures

a. General. The first step in servicing a defective AN/VRM-l is to localize the fault. Localization means tracing the fault to a plug-in assembly board, the front panel, or a cable. The second step is to isolate the fault. Isolation means tracing the fault to a defective part responsible for the abnormal condition. Some faults, such as burned-out resistors, can often be located by sight or smell. The majority of faults, however, must be isolated by checking voltages or resistances.

b. Localization. The first step in finding a trouble is to determine which assembly or assemblies are at fault by the following methods:

(1) *Visual inspection. The* purpose of visual inspection is to locate faults without testing or measuring circuits. Cables, connectors, indicator lamps, and the fuse should be inspected and an attempt made to localize the fault to a particular assembly.

(2) *Operational tests.* Operational tests frequently indicate the general location of trouble. In many instances, the tests will help in determining the exact nature of the fault. The equipment performance checklist (TM 11-6625-496-12) is a good operational test.

(3) *Troubleshooting Chart. The trou*ble symptoms listed in the chart (para 33) will aid in localizing a trouble to-an assembly or part.

c. *Isolation. The tests* listed below will aid in isolating the trouble. After the trouble has been localized to an assembly, isolate the trouble within the assembly by voltage, resistance, and continuity measurements.

(1) Voltage *and resistance measurements. This* equipment contains transistors. Observe all precautions to prevent damage to transistors. Make voltage and resistance measurements only as specified. When measuring voltages, use tape or sleeving to insulate the entire test prod, except for the extreme tip. A momentary short circuit can ruin the transistor. Use the resistor and capacitor color codes (fig. 35 and 36) to find the value of components. Use the resistance

chart (para 34) and the schematic diagram (fig. 39) to find normal readings, and compare them with readings taken.

(2) *Intermittent troubles. In all these tests, the* possibility of intermittent troubles should not be overlooked. If present, this type of trouble often may be made to appear by tapping or jarring the equipment. Check the wiring and the connections to the AN/VRM-l.

30. Test Equipment Required

The following chart lists equipment required for troubleshooting Test Set, Radio AN/VRM-1:

Equipment	Technical manual
Cable Assembly, Power, Electrical CX-4720/VRC	TM 11-5820-401-10
Mounting MT-1029/VRC....	TM 11-5820-401-10
Multimeter ME-26B/U	TM 11-6625-200-12
Power Supply PP-2309/U...	
Tool Kits TK-87/U and TK-88/U.	

Section Il. TROUBLESHOOTING

Caution: Do not attempt removal or replacement of parts before reading the instructions given in paragraphs 35 through 40.

31. Checking Dc Supply Circuit for Shorts

a. *When to Check.* Check for short circuits and clear the trouble whenever abnormal symptoms reported from operational tests indicate possible dc supply circuit troub1es. (Refer to equipment performance checklist, TM 11-6625-496-12.)

b. Conditions for Test. To prepare for the short-circuit tests, perform the following operations:

(1) Turn the selector switch to A.
(2) Set the ON-OFF switch to ON.
(3) Disconnect CX-7899/VRM-l from the front panel of the TS-1777/VRM-1.
(4) Check to be sure that fuse F7901 is *good.*
(5) Remove the front panel and chassis assembly from the case (para 36).

c. *Measurements. Make the resistance* measurements indicated in the chart below. If abnormal results are obtained, make the additional isolating checks outlined. When the faulty part is found, repair the trouble before applying power to the unit.

Note: When measuring resistance, negative voltage is applied to the OHMS lead of the ME-26BAJ. If another type of meter is used, determine the polarity of the ohmmeter leads before checking the dc supply circuit for shorts.

Step	Point of measurement	Normal indication	Isolating procedure
1	Between terminal B and A of J7902 (common lead to terminal B).	Approximately 700 ohms	If resistance is very low or zero, remove plug-in assembly A7800 (para 37), disconnect one end of diode CR7902, and perform step 2.
2	Repeat step 1	Infinite	If resistance is less than infinite, trouble is in chassis wiring. If resistance is normal, trouble is in assembly A7800 or diode CR7902. Replace each (para 37 and 38) and repeat step 1.

32. Test Setup

Remove the front panel and chassis assemblies from the case (para 36) and make the test setup outlined below.

a. Power Supply Connections. For bench testing power apply PP-2309/U is used in place of a vehicular electrical system which is normally used to furnish power

to the AN/VRM-l. Connect the AN/VRM-l as follows:

(1) Connect Mounting MT-1029/VRC to the output of the PP-2309/U; use the CX-4720/VRC. Connect the black lead of the CX-4720/VRC to the negative OUTPUT terminal of the PR-2309/U.

(2) Plug the three-terminal connector of the CX-7899/VRM-l into J24 of the MT-1029/VRC.

(3) Connect the four-terminal connector of the CX-7899/VRM-l to the POWER connector of the AN/VRM-1.

Note: If Power Supply PP-2309/U is not available, use an equivalent power source. Connect it in the same manner as the PP-2309/U.

b. Test Equipment. Connect the test equipment as specified for the particular test being performed.

33. Localizing Troubles

a. General. Procedures for localizing troubles to individual plug-in assemblies and their associated circuits are given in the troubleshooting chart (d below). Parts locations are shown in figures 12 through 17. Figure 39 is a schematic diagram of the TS-1777/VRM-l. Refer to figure 39 for parts values. Figure 11 shows the wiring of switch S7902 .

b. Use of *Chart.* The troubleshooting chart is designed to supplement the operational checks detailed in TM 11-6625-496-12. If previous operational checks have not been performed, perform the procedures given in the equipment performance checklist (TM 11-6625-496-12) and note any troubles which appear.

Caution: If operational symptoms are not known, or if they indicate the possibility of a short in the dc supply circuit, perform the short-circuit checks in paragraph 31 before applying power to the unit .

c. *Conditions for Tests.* All checks outlined in the following chart are to be conducted with the AN/VRM-1 connected to a power source as described in paragraph 32.

d. Troubleshooting Chart.

Symptom	Probable trouble	Correction
1. RED lamp DS7901 does not light when ON-OFF switch is set to ON.	Defective CX-7899/VRM-1	Check CX-7899/VRM-1 (para 40).
	Low input voltage	Check input voltage.
	Open wiring between connectors J7902 and J7907.	Check chassis wiring between J7902-B and J7907-B and -C. Check POWER switch S7901, fuseholder XF7901, CR7901, and R7901. Check lampholders XDS7901 and XDS7902.
	Potentiometer R7816 improperly adjusted.	Adjust R7816 (para 43). If R7816 cannot be adjusted properly, higher echelon repair of A7800 required.
2. GREEN lamp DS7902 does not light (selector switch in position A) when test probe is inserted in test jack A.	Diode CR7902 defective	Check for +16 volts dc at test jack A. If voltage at test jack A is excessively high, replace CR7902 (para 38).
	Defective probe or probe cable wiring.	Check wiring from probe tip to J7903-A.
	Defective chassis wiring from probe cable to assembly A7800.	Check the chassis wiring from J7903-A to J7907-L. Check S7902 for open circuit. Check for open circuit between P7501-A and P7501-B.
	Defective or maladjusted assembly A7800 or A7500.	Adjust R7801 and R7803 in A7800, and R7501 in A7500 (para 44[3]). If R7801 or R7803 cannot be adjusted properly, higher echelon repair of A7800 is required. If potentiometer R7501 cannot be adjusted properly, higher echelon repair of A7500 is required.

Symptom	Probable trouble	Correction
3. AN/VRM-1 operates normally when selector switch is in position A, but not in position 8.	Defective chassis wiring or defective S7902.	Check wiring from J7903-A to J7907-L. Refer to paragraph 34 for trouble isolation procedure for S7902. Check for continuity between J7907-M and J7907-H. Perform correction in 2 above.
4. AN/VRM-1 operates normally when selector switch is in positions A, but not in position 2.	Defective R7902 or R7917	With S7902 in position A, check the resistance of R7917 and R7902.
	Defective chassis wiring or defective S7902.	Check wiring from J7903-A to J7907-H. Refer to paragraph 34 for trouble isolation in S7902.
5. AN/VRM-1 operates normally when selector switch is in position A, but not in position 3, 4, 5, 6, 10, or 11.	No power to assembly A7400 or defective S7902.	Check for +16 volts dc at connector J7905-H. If no voltage is present, check wiring between J7905-H and J7907-A. Refer to paragraph 34 for trouble isolation procedure for S7902.
	Potentiometer R7406 out of adjustment or assembly A7400 defective.	Adjust R7406 (para 43). If R7406 does not adjust properly, higher echelon repair of A7400 is required.
	Defective C7503 in A7500	Check A7500 by substitution (para 37).
	Defective chassis wiring or defective S7902.	Check chassis wiring from J7903-H to J7905-M and from J7905-K to J7907-H. Refer to paragraph 34 for trouble isolation in S7902.
6. AN/VRM-1 operates normally when selector switch is in position 10, but not in one or more of positions 3, 4, 5, 6, and 11.	Defective resistors in circuits that fail to operate properly.	Check resistance of R7904 (position 4), R7905 (position 5), R7906 (position 6), R7903 (position 3), and R7909 (position 11) with S7902 in position A.
	Defective wiring in circuits that fail to operate properly.	Check S7902 for broken jumper wires and defective switch contacts (para 34).
7. AN/VRM-1 operates normally when selector switch is in position A, but not in position 7, 9, 12, 13, 14, 15, 16, 17, or 18.	Defective probe or probe cable....	Check probe center conductor for continuity.
	Defective C7901	Check C7901 by substitution (para 38).
	Defective L7501 in assembly A7500.	Check for continuity between connector P7501-K and -F. If there is no continuity, higher echelon repair of A7500 is required.
	Defective chassis wiring	Check chassis wiring from C7901 to S7902, and from probe center conductor to J7905-B.
8. AN/VRM-1 operates normally when selector switch is in position A, but not in position 7, 9, 13, or 14.	No power to assembly A7600.....	Check for approximately +16 volts dc at J7906-H. If no voltage is present, check wiring between J7906-H and J7907-A.
	No power to probe	Check wiring between J7905-C, J7904-L, and S7902E (fig. 11).
	Defective CR7402 in assembly A7400.	Check A7400 by substitution (Para 37).
	Potentiometer R7611 out of adjustment or assembly A7600 defective.	Adjust potentiometer R7611 in A7600 (para 43). If R7611 does not adjust properly, higher echelon repair of A7600 is required.
	Defective switch S7902 or switch wiring.	Refer to paragraph 34 for trouble isolation of S7902. Check wiring from J7906-C to S7902C-14, and from J7906-K to S7902D-14.

Symptom	Probable trouble	Correction
9. AN/VRM-1 operates normally when selector switch is in position 14, but not in one or more of positions 7, 9, and 13.	Defective resistors in circuits which fail to operate properly.	Check resistance of R7908 (position 9), R7910 (position 13), and R7907 (position 7) with switch S7902 in position A.
	Defective S7902 or switch wiring.	Check S7902 for broken jumper wires and defective switch contacts (para 34).
10. AN/VRM-1 operates normally when selector switch is in position A, but not in position 12, 15, 16, or 17.	No power A7700	Check J7904-L for approximately +16 volts dc. If no voltage is present, check wiring between J7904-L and S7902E-17 (para 34).
	No power to probe	Check for approximately +16 volts dc at J7905-A. If no voltage is present, check wiring between J7905-A and S7902E-17.
	Defective CR7403 in A7400	Check A7400 by substitution (para 37).
	Defective A7700, or R7708 in A7700 out of adjustment.	Adjust potentiometer R7708 in A7700 (para 43). If R7708 does not adjust properly, higher echelon repair of A7700 is required.
	Defective switch S7902 or switch wiring.	Refer to paragraph 34 for trouble isolation in S7902. Check wiring from J7904-M to S7902C-17; and from J7904-J to S7902D-17.
11. AN/VRM-1 operates normally when selector switch is in position 15, 16, or 17, but not in position 12.	Defective switch S7902 or switch wiring.	Check S7902 for defective contacts (para 34). Check wiring from J7903-M to S7902A-12 and from J7903-C to S7902B-12.
	Defective filter FL7501 in assembly A7500.	Check A7500 by substitution (para 37).
12. AN/VRM-1 operates normally when selector switch is in position 12 but not in one or more of positions 15, 16, and 17.	Defective resistors in circuits which fail to operate properly.	Check resistance of R7914 (position 17), R7913 (position 16), and R7911 (position 15) with switch S7902 in position A.
	Defective switch S7902 or switch wiring.	Check S7902 for broken jumper wires and defective contacts (para 34).
13. AN/VRM-1 operates normally when selector switch is in position A, but fails to operate properly in position 18.	No power to assembly A7700.....	Check J7904-D for approximately +16 volts dc. If no voltage is present, check wiring between J7904-D and S7902E-18 (para 34).
	No power to probe	Check for approximately +16 volts dc at J7905-D. If no voltage is present, check wiring between J7905-D and S7902E-18.
	Defective diode CR7401 in assembly A7400.	Check A7400 by substitution (para 37).
	Defective switch S7902, switch wiring.	Refer to paragraph 34 for trouble isolation in S7902. Check wiring from S7902A-18 to S7902B-18; from J7904-B to S7902C-18; and from J7904-F to S7902D-18.
	Defective assembly A7700, or potentiometer R7718 on assembly A7700 out of adjustment.	Adjust R7718 in A7700 (para 43). If R7718 does not adjust properly, higher echelon repair of A7700 is required.

34. Isolating Troubles in Switch S7902

When trouble has been localized to S7902, it must be determined if the switch itself is defective, or if jumper wires between contacts and between decks are broken,

or resistors between S7902A and S7902B are defeotive.

a. use the wiring diagram (fig. 11) and oheck for broken jumper leads between switch oontacts and between decks. Check also for oold solder joints, or large masses of solder whioh maybe shorting two contacts together. Cheek for open or shorted switch oontacts.

b. Use the ohart below and oheck S7902A and S7902B for open resistors or for resistors with ohanged values. Remove all plug-in assemblies (para 37) before measuring resistances.

Contact No. S7902A and S7902B	Resistor	Value (ohms)
2	R7902	8,450
3	R7903	105,000
4	R7904	511,000
5	R7905	10,000
6	R7906	26,100
7	R7907	1,100
9	R7908	475
11	R7909	243,000
13	R7910	845
15	R7911	22.1
16	R7913	113
17	R7914	200

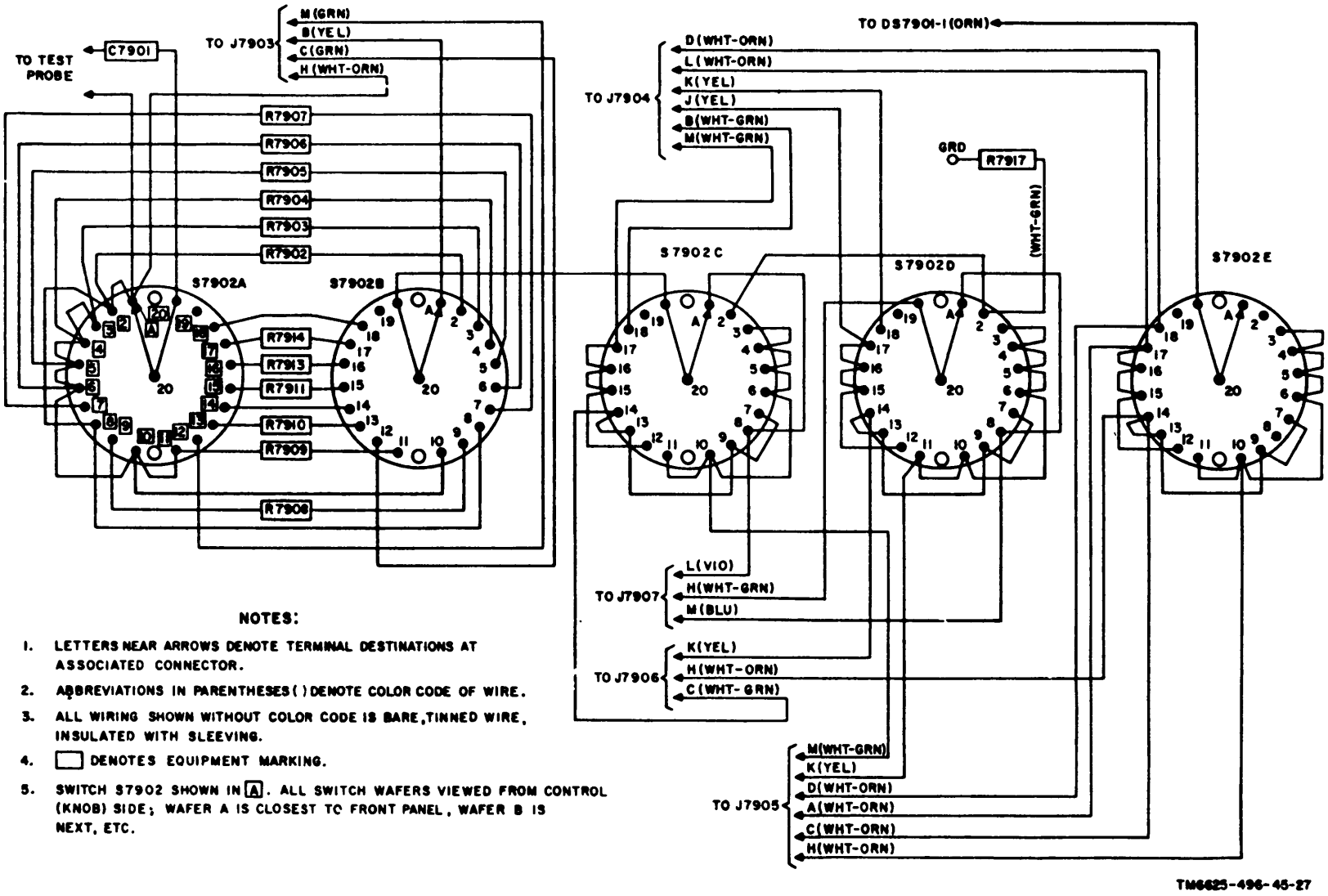


Figure 11. Selector switch S7902, wiring diagram.

Section III. REPAIRS

35. General Parts Replacement Techniques

All the parts of Test Set, Radio AN/VRM-1 can be reached and replaced easily without special procedures. The following precautions apply specifically to the AN/VRM-1.

a. Use a pencil-type soldering iron with *a* 25-watt maximum capacity. The AN/VRM-1 contains semiconductor devices and is transistorized. If the iron must be used with ac, use an isolating transformer between the Iron and the ac line. Do not use *a* soldering gun damaging voltages can be induced in Components.

b. When soldering semiconductor leads, solder quickly, wherever wiring permits, use a heat sink (such as long-nosed pliers) between the soldered joint and the semiconductor.

36. Removal and Replacement of Front Panel and Chassis (fig. 12 and 18)

a. *Removal.* Remove the front panel and chassis from the ease as follows:

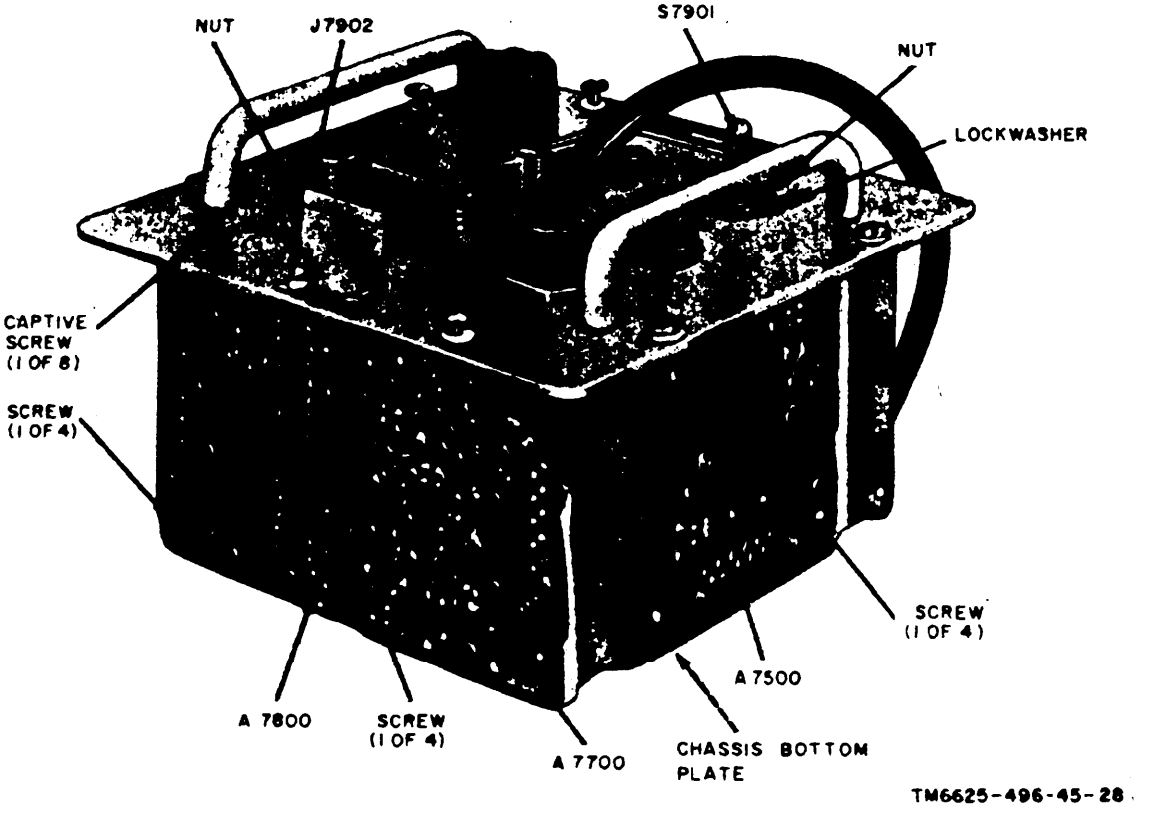
(1) Loosen the eight captive screws (fig. 12) that secure the front panel to the case.

(2) Carefully lift the front panel and chassis out of the case; be careful not to damage the gasket (fig. 18).

b. Replacement. Replace the front panel and chassis as follows:

(1) Place the front panel gasket in position on the case.

(2) Place the front panel and chassls over the chassis well (test *jack* A next to the case cable compartment) and carefully lower the front panel and chassis into the chassis well



Figue 12. Test Set, Radio TS-177/VRM-1, upper left oblique view.

make sure that the captive screws on the front panel line up with the holes In the gasket and the screw holes in the ease.

(3) Tighten the eight captive screws.

37. Removal and Replacement of Plug-in Assmblies (fig. 12 and 13)

a. *Removal. Remove each* plug-in assembly as follows:

(1) Remove the front panel and chassis *from the ease* (para 36a).

(2) Remove the four screws that secure the plug-in assembly to the chassis.

(3) Carefully unplug the plug-in assembly from the female connector in the chassis.

b. Replacement. Replace each plug-in assembly as follows:

(1) Carefully insert the plug-in assembly male connector into the appropriate chassis receptacle; be careful not to damage connector pins.

(2) Secure the plug-in assembly use the four screws *(a(2) above).*

(3) *Replace the* front panel and chassis in the ease (pare *36b).*

38. Removal and Replacement of Components on Front Panel and Chassis

Remove all plug-in assemblies as described in paragraph 37a before performing any of the removal procedures given below. Replace all plug-in assemblies M described in paragraph *37b* after performing the replacement prooedures given below.

a. Removal of Chassis Bottom Plate (fig. 12 and 14).

(1) Remove four 440 screws.

(2) Remove two 6-32 screws.

(3) Remove two nuts from the studs that secure the chassis bottom plate to the rear of switch S7902.

(4) Remove the chassis bottom plate.

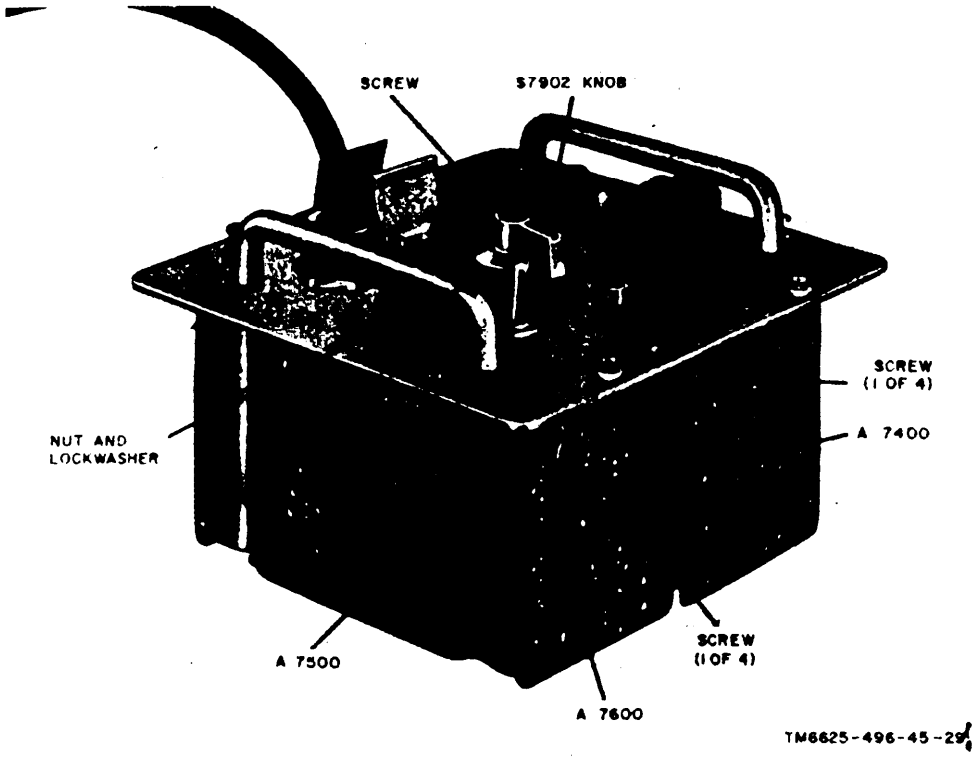


Figure 13. Test Set, Radio TS-1777/VRM-1, lower left oblique view.

b. Replacement of Chassis Bottom *Plate (fig.* 12 and 14).

(1) Place the chassis bottom plate in position so that the two studs on switch S7902 extend through the holes prodded and secure them: use the two nuts (a(3) above).

(2) Replace and tighten the two 6-32 screws *(a(2) above).*

(3) Replace and tighten the four 4-40 screws (a(l) above).

c. *Removal of Connector J7902 (fig.* 12 and 14).

(1) Remove the chassis bottom plate *(a above).*

(2) Remove the red lead from J7902 at the upper contact of switch S7901, and the black lead from J7902 at the ground lug at connector S7907.

(3) Remove the nut on the front panel side of connector J7902 and remove connector J7902 from the rear of the panel.

d. *Replacement of Connector* J7902 (fig. 12 and 14).

(1) Insert the connector from the rear of the front panel and secure it in place; use the nut (c(3) above).

(2) Connect the red lead to the upper contact of switch S7901, and the black lead to the ground lug at connector J7907.

(3) Replace the chassis bottom plate *(b above).*

e. Removal at Lamp Sockets XDS7901 and XDS7902 (fig. *14).*

(1) Remove the chassis bottom plate (a above).

(2) Remove and tag the three leads from each socket.

(3) Remove the nut from the front panel rear side of each socket, and remove each socket from the front side of the front panel.

f. *Replacement* of *Lamp Sockets XDS7901 and XDS7902* (fig. 14).

(l) Insert each socket through the front side of the front panel and secure each; use the nut (e(3) above).

(2) Reconnect the wires (e(2) above).

(3) Replace the chassis bottom plate (b above).

g. *Removal of* Fuseholder XF7901 (fig. 14).

(1) Remove the chassis bottom plate (a above).

(2) Remove two wires from the fuseholder.

(3) Remove the nut and lookwasher from the front panel rear side of the fuseholder, and remove the fuseholder from the front side of the front panel.

h. Replacement of Fuseholder XF7901 (fig. 14).

(1) Insert the fuseholder through the front side of the front panel and secure it; use the nut and lockwasher (g(3) above).

(2) Reconnect the two wires (g(2) above).

(3) Replace the chassis bottom plate (b above).

i. *Removal of Test Jack A* (fig. 14).

(1) Remove the chassis bottom plate *(a above).*

(2) Remove one wire from the test jack.

(3) Remove the nut from the front panel rear side of the test jack, and remove the test jack from the front side of the front panel.

j. *Replacement of Test Jack A* (fig. 14).

(1) Insert the test jack through the front side of the front panel and secure it; use the nut (i(3) above).

(2) Reconnect the Wire (i(2) above).

(3) Replace the chassis bottom cover (b above).

k. Removal of Switch S7901 (fig. 12 and 14).

(1) Remove the chassis bottom cover *(a above).*

(2) *Remove* two *wires* from the switch.

(3) Remove the nut and lockwasher from the front panel front side of the switch and remove the switch from the rear of the front panel.

1. Replacement of Switch S7901 (fig. 12 and 14).

(1) Insert switch S7901 from the rear side of the front panel; be careful to seat the locating lug in the hole provided.

(2) Secure switch S7901; use the nut and lockwasher (k(3) above).
(3) Reconnect the two wires (k(2) above) .
(4) Replace the chassis cover plate (b *above).*

m. Removal of Connectors J7907, J7904, J7903, *J7906, and J7905* (fig. 14 and 15).
(1) Remove the chassis bottom plate (a above).
(2) Remove and tag wires from the terminals of the connector being removed (11 for J7907, 7 for J7904, 9 for J7903, 4 for J7906 and 8 for J7905).
(3) When removing J7903, remove two locating pins, two lockwashers, and two nuts.
(4) When removing J7907, J7904, J7906, or J7905, remove the two locating pins, one lockwasher, one solder lug, and two nuts.
(5) Remove the connector from the chassis; note the position of pin A with respect to the chassis.

n. Replacement of Connectors J79078 J7904, J7903, J7906, and J7905 (fig. 14 and 15) l
(1) Place the connector in position (noted when removed).
(2) When replacing J7903 secure it in place; use two locating pins, two lockwashers, and two nuts (m(3) above) .
(3) When replacing J7907, J7904, J7906, or J7905, secure it inplace; use the two locking pins, one lockwasher, one solder lug, and two nuts (m(4) above).
(4) Remove tags and reconnect the wires (m(2) above).
(5) Replace the chassis bottom plate *(b above).*

o. Removal of Resistor R7917, Diode CR7901, and Capacitor C7901 (fig. 14).
(1) Remove the chassis bottom plate (a above).
(2) Unsolder each end of each component from the supporting terminal.
(3) Remove the component.

p. Replacement of Resistor R7917, Diode CR7901, and Capacitor C7901 (fig. 14).
l (1) Place the component in position between the appropriate supporting terminals.
(2) Solder the components. (Refer to paragraph 35.)
(3) Replace the chassis bottom plate *(b above).*

q. Removal of Diode CR7902 (fig. 14).
(1) Remove the chaasis bottom plate *(a above).*
(2) *Remove two wires* from the diode. (Refer to paragraph 35.)
(3) Remove the nut and lockwasher from the diode stud end and remove the diode.

r. *Replacement of Diode CR7902 (fig.* 14) .
(1) Insert *the* stud end of the diode through the mounting hole and secure It; use the nut and lockwasher (q(3) above).
(2) Reconnect and solder the two wires (q(2) above). (Refer to paragraph 35.)
(3) Replace the chassis bottom plate *(b above).*

8. Removal of Resistor R7901 (fig. 14).
(1) Remove the chassis bottom plate (a above).
(2) Remove two wires from the resistor terminals.
(3) Remove the two screws and two self-locking nuts and remove the resistor.

t. *Replacement* of *Resistor R7901 (fig.* 14).
(1) Place the resistor in position and secure it; use the two screws and two self-locking nuts (s(3) above).
(2) Reconnect and solder the two wires removed in (s(2) above). (Refer to paragraph 35.)
(3) Replace the chassis bottom plate *(b above).*

u. Removal of Switch S7902.
(1) Remove the chassis *bottom* plate *(a above).*

(2) Unsolder and remove the 26 leads and one lead of capacitor C7901 from S7902; tag each lead as it is removed (fig. 14).
(3) Remove the screw, knob, nut, and lockwasher from the front panel front side of the switch (fig. 13).
(4) Remove the S7902 from the rear side of the front panel.

v. *Replacement* of *Switch* S7902.

(1) Insert the shaft of S7902 through the rear of the front panel, with contacts A and 20 uppermost; be careful to seat the locating lug in the hole provided in the front panel (fig. 13).
(2) Replace the lockwashe*r and* tighten the nut (u(3) above).
(3) Install the knob and tighten the Screw (u(3) above).
(4) Remove the tags and solder the lead to capacitor C7901 and solder the 26 leads (u(2) above and fig. 14).

w. *Removal of Resistors Mounted on Switch S7902.*

(1) Refer to figures 16 and 17 for the physical location of the resistor.
(2) Unsolder and remove the resistor leads from the solder lugs of switch S7902. Be careful not to damage or drop solder Into the contacts of switch S7902.

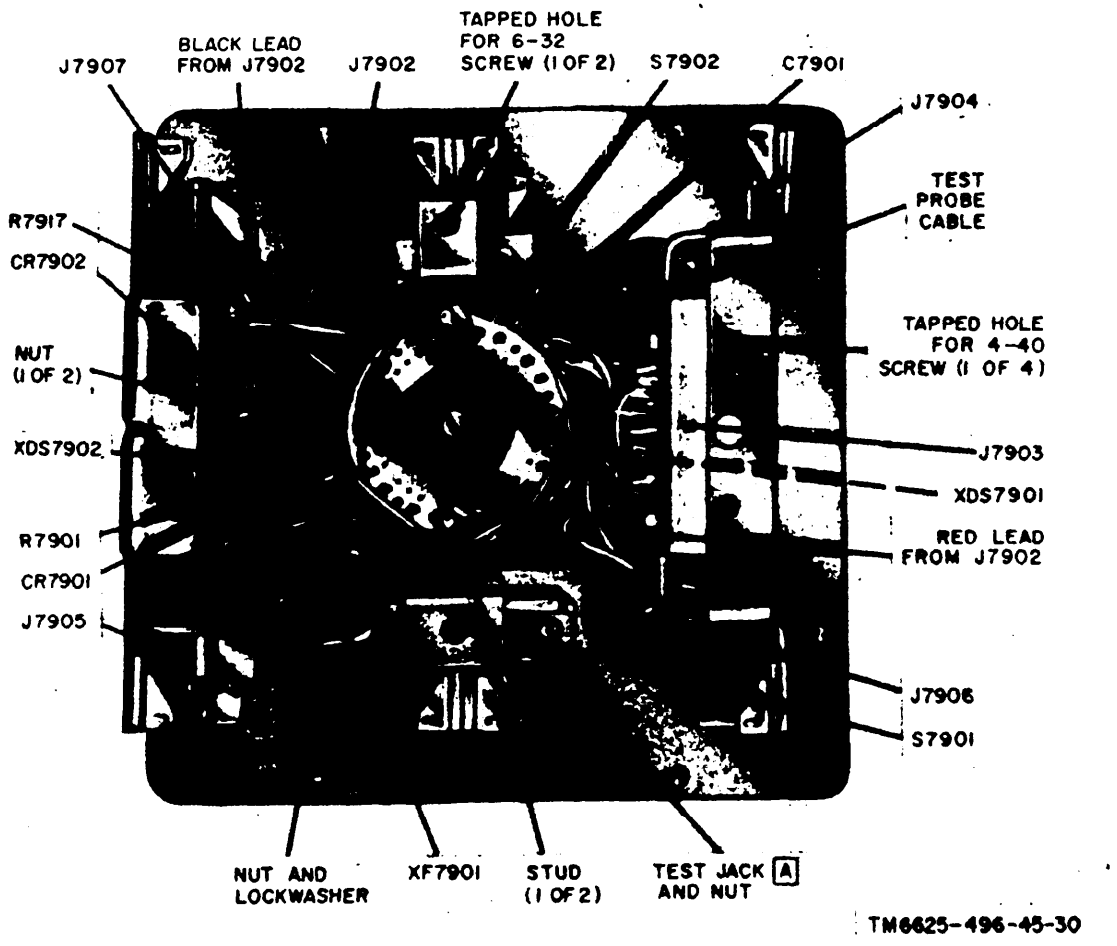


Figure 14. Test Set, Radio TS-1777/VRM-1 front panel and chassis, rear view, chassis bottom plate removed.

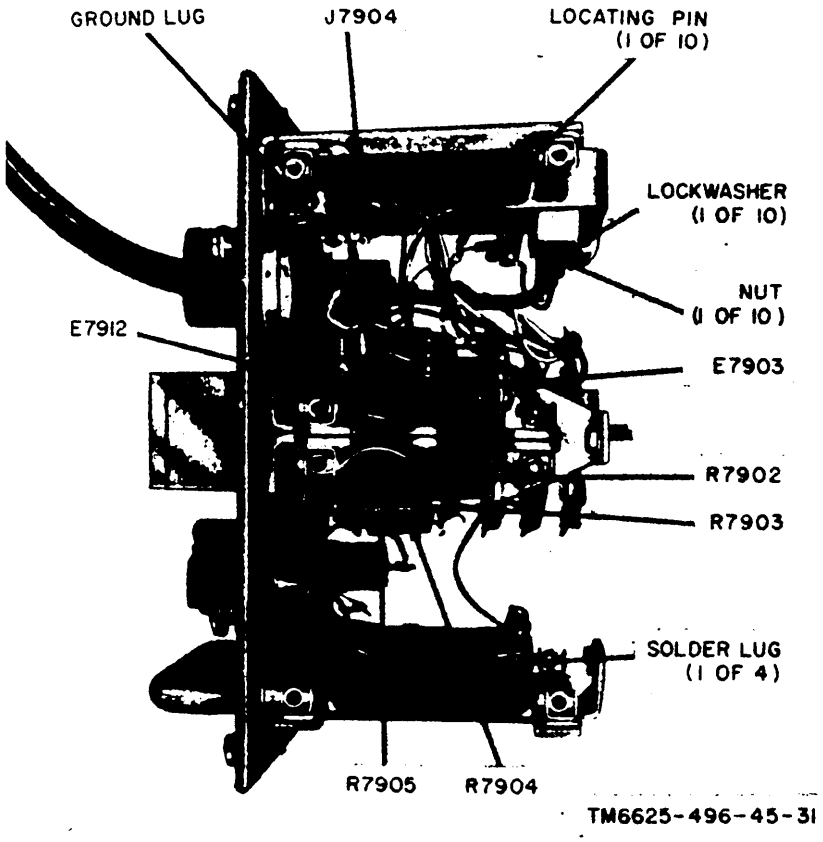


Figure 15. Test Set, Radio TS-1777/VRM-1 front panel chassis, top view.

x. Replacement of Resistors Mounted on switch S7902.

(1) Cut the resistor leads to the proper length and make a good mechanical connection at the solder lugs of switch S7902.

(2) solder the resistor 1 e a d to the solder lugs of switch S7902. Be careful not to damage or drop solder into the contacts of switch S7902.

39. Removal and Replacement of Case Gasket (fig. 18)

a. Removal. Remove the gasket by peeling it off the case face.

b. Replacement. Apply sealant to the replacement gasket and apply it to the case face so that the holes in the gasket line up with the holes in the case.

40. Repair of Cables

a. Removal of Test Probe Cable (fig. 15 and 19).

(1) Remove the outer cable shield connection from terminal E7903.

(2) Remove the inner cab1e shield connection at the ground lug on connectcr J7904.

(3) Remove the inner cable conductor connection at terminal E7912.

(4) Remove the coupling nut on the front panel front side of the probe cable box connector, and remove the cable, nut, washer, and grommet.

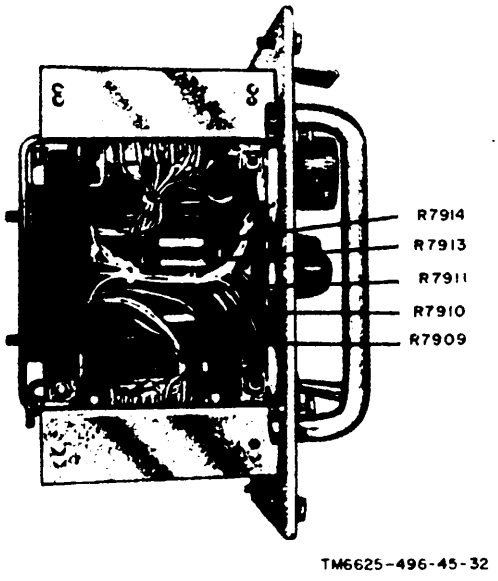


Figure 16. Teat Set, Radio TS-1777/VRM-l front panel and chassis. left view.

b. Replacement of Test Probe cable (fig. 15 and 19).

(1) Insert the probe cable end through the coupling nut, washer, and grommet (a(4) above). (A new grommet should be used if available.)

(2) Connect and solder the inner cable conductor to terminal E7912.

(3) Connect and solder the inner shield to the ground lug on connector J7904.

(4) Connect the outer shield to terminal E7903.

(5) Press the grommet into the box connector and tighten the coupling nut.

c. *Repair of Cable Assembly, Special Purpose, Electrical, Branched CX-7899/* VRM-l(fig. 20).

(1) Repairs of the CX-7899/VRM-l are limited to replacing the 18-terminal connector and repairing

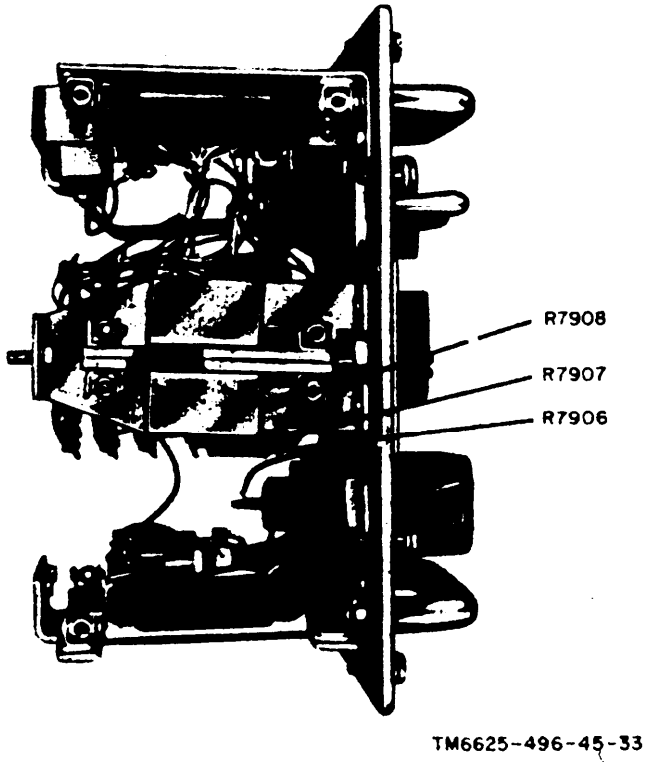


Figure 17. Test Set, Radio TS-1777/VRM-1 front panel and chassis, bottom view.

breaks in the cables near this connector. Figure 20 is a cable wiring diagram and exploded view of the CX-7899/VRM-l.

(a) Disassemble the 18-terminal connector as follows:

(a) Remove four screws.

(b) Remove the connector shell.

(c) Remove the connector c1amp from the female connector.

(3) Reassemble the 18-tertinal connector as follows:

(a) Place the cables in the grooves provided in the connector shell.

(b) Slide the connector clamp over the cables and under the female connector.

(c) Secure the three pieces together and replace and tighten the four screws.

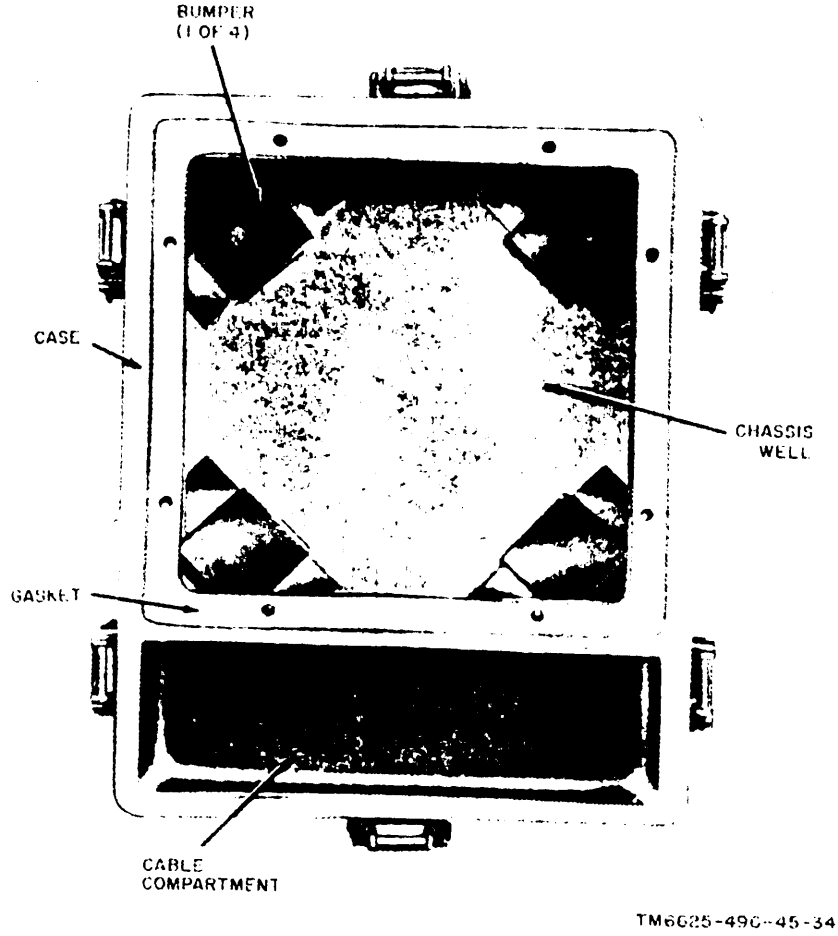


Figure 18. Test Set, Radio *TS-1777/VRM-1 case with front panel and chassis removed.*

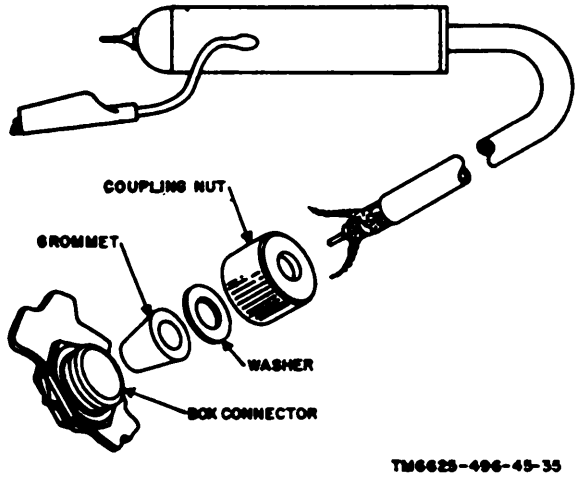


Figure 19. Test probe cable, disassembled.

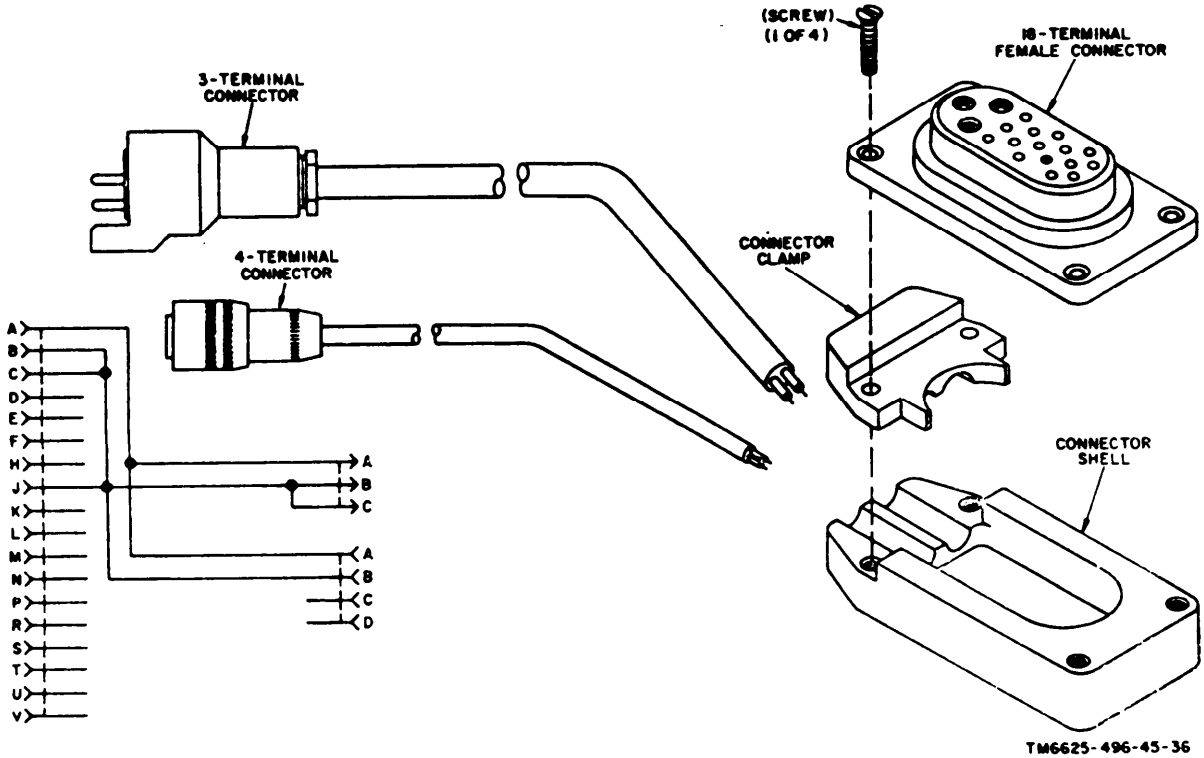


Figure 20. Cable Assembly, Specail Purpose, Electrical Branched CX-7899/VRM-l, partially disassembled and schematic diagram.

Section IV. FINAL ADJUSTMENTS

41. General

Final adjustment of the TS-1777/VRM-l must be performed after major repair, parts replacement, or extensive alignment of individual plug-in assemblies. The final adjustment procedures can also be used as a quick check to see if the TS-177/ VRM-1 circuits are properly adjusted.

42. Test Equipment and Special. Tools Required

a. The following chart lists test equipment required for final adjustment of Test Set, Radio AN/VRM-l. Associated technical manuals are also listed.

Test equipment	Technical manual
Audio Oscillator TS-382F/U	TM 11-2684
Cable Assembly, Power, Electrical CX-4720/VRC	TM 11-5820-401-10
Voltmeter TS-443/U	TM 11-6625-414-10
Voltmeter, Electronic ME-30B/U	TM 11-5132
Mounting MT-1029/VRC	TM 11-5820-401-10
Multimeter ME-26B/U	TM 11-6625-200-12
Power Supply PP-2309/U	
Hf Signal Generator 606A (Hewlett-Packard Co.)	
Rf Millivoltmeter 411A (Hewlett-Packard Co.)	
Transistor Power Supply 721A (Hewlett-Packard Co.)	

b. The special tool required for final adjustment is Cable No. 10 (fig. 21).

43. Final Adjustments

Adjust the AN/VRM-l as directed in the procedures below, in the order given. Figure 23 shows the location of the final adjust ments.

Note: All voltages are measured to chassis unless otherwise specified.

a. Connection Data (fig. 22). Perform the following procedure prior to final adjustments:

(1) Remove the TS-1777/VRM-l front panel and chassis from the case (para *36a).*

(2) Connect the PP-2309/U, CX-4720/ VRC, MT-1029/VRC, CX-7899/ VRM-1, and TS-1777/VRM-l (para 32).

(3) Connect the TS-443/U across the output terminals of the PP-2309/ u.

(4) Set the PP-2309/U for O-volt dc output, and turn it on.

(5) Set the TS-1777/VRM-l ON-OFF switch to ON.

Caution: Always remove the test signal to the test probe before removing power from the TS-177/ VRM-1.

b. *Line Voltage Sensing Circuit* (fig. 33).

(1) Increase the PP-2309/U output for an indication on the TS443/U of approximately 5 volts dc.

(2) Measure the dc voltage at the emitter of transistor Q7806 (ungrounded side of potentiometer R7816); use the ME-26B/U. Adjust potentiometer R7816 for an indication of less than +2 volts dc.

(3) Increase- the output of the PP-2309/U for an indication on the TS-443/U of 21.5 volts dc.

(4) Adjust potentiometer R7816 in the increasing voltage direction until RED indicator lamp DS7901 switches on (as indicated by a sudden drop in voltage at the emitter of Q7806). This action should occur at approximately +12 volts dc.

(5) Reduce the output of the PP-2309/ U to O volt dc; then increase it slowly until RED indicator DS7901 lights. (Note a sudden drop in voltage measured at the emitter of Q7806.) The PP-2309/U output voltage as indicated on the TS-443/U, required to light RED indicator lamp DS7901, should be 21.5 volts dc. Readjust the potentiometer R7816 as necessary to assure this condition.

c. *Voltage Supply Limits Sensing Circuit* (fig. 33). Connect the equipment as shown in figure 24.

(1) Turn the TS-1777/VRM-l selector switch to position 8.

(2) Increase the output of the PP-2309/U to 26 volts dc.

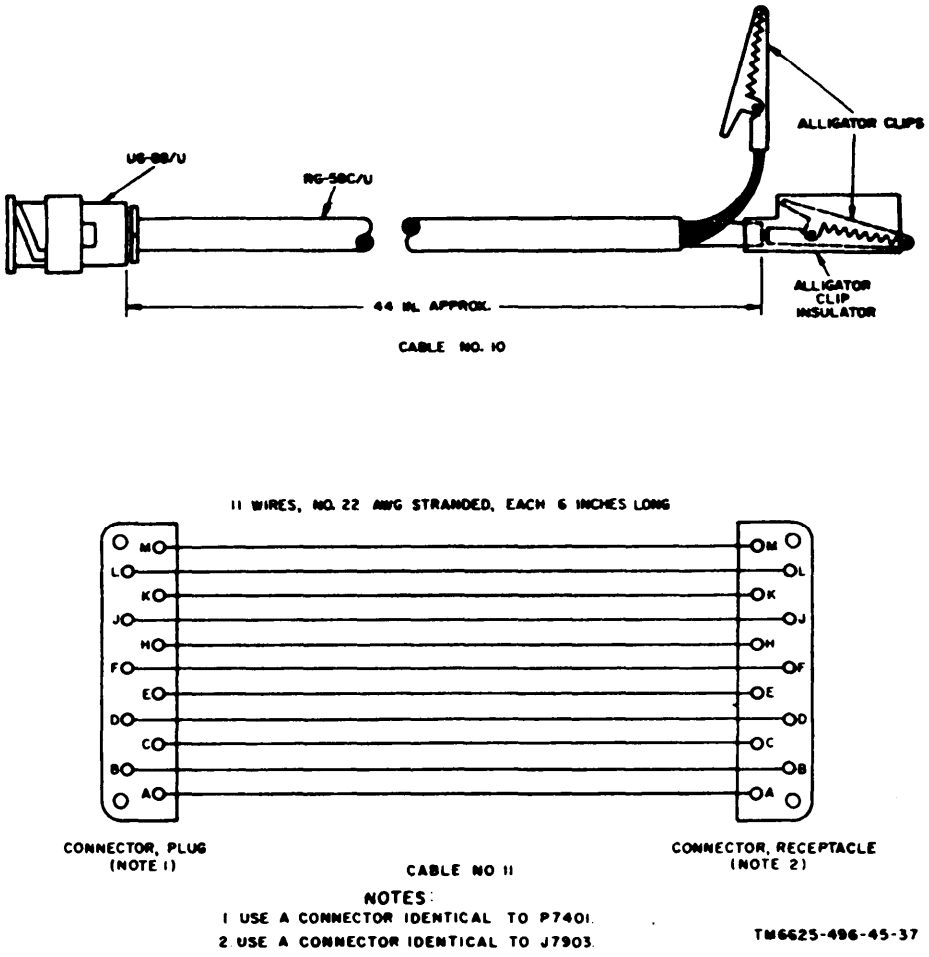


Figure 21. Fabrication of special test cables.

(3) Use the Transistor Power Supply 721A and apply +5 volts dc to the test probe.

(4) Measure the voltage at connector P7801-H with the ME-26B/U; adjust potentiometer R7803 for approximately +0.5 volt dc.

(5) Measure the voltage of the emitter of transistor Q7801 (ungrounded side of potentiometer R7801) with the ME-26B/U; adjust potentiometer R7801 for approximately +1 volt dc .

(6) Measure the 721A output with the TS443/U; increase the output to 13.0 volts dc.

(7) Measure voltage at the emitter of transistor Q7801 with the ME-26B/U; adjust potentiometer R7801 in the increasing voltage direction until a sharp drop in voltages indicates transistor Q7801 has triggered. This should occur at approximately +9.5 volts dc.

(8) Reduce the output of the 721A to zero, then carefully increase it to 10.5 volts dc as indicated by the TS-443/U.

(9) Measure the dc voltage at connector P7801-H with the ME-26B/U; carefully a d just potentiometer R7803 until a sudden drop in the measured voltage indicates GREEN indicator DS7902 has switched on.

(10) Reduce the output of the 721A to

O volt dc; then slowly increase it. Observe the voltage on the TS-443/U when a sudden drop in the voltage measured by the ME-26B/U indicates G R E E N indicator DS7902 has switched on and a sudden rise in voltage indicates GREEN indicator DS7902 has switched off. The GREEN indicator should switch on when the ME-443/U indicates 10.5 volts and switch off at 13.0 volts.

(11) If necessary, readjust potentiometer R7803 and R7801 to assure the conditions given in (10), above.

d. DC Circuits (fig. 33). Connect the equipment as shown in figure 24.

(1) Reduce the 721A output to 0 volt dc.

(2) Turn the TS-1777/VRM-l selector switch S7902 to position A.

(3) Raise the 721A output to 14.2 volts dc as indicated by the TS-443/U.

(4) Measure the dc voltage at connector P7801-H with the ME-26B/U; adjust potentiometer R7501 on A7500 for an indication of approximately +2 volts dc.

(5) Carefully adjust potentiometer R7501 until GREEN indicator DS7902 switches on indicated by a sudden drop in voltage measured at P7801-H.

(6) Reduce the 721A output to **0** volt dc; then slowly increase it. Observe , the voltage indication on the TS-443/U when a sudden drop in monitor voltage measured by the ME-26 B/U occurs, which indicates that GREEN indicator DS7902 has switched on. The indication on the TS-443/U should be 14.2 volts.

(7) If necessary, readjust R7501 to assure the condition given in (6) above.

e. *Audio Circuits* (fig. 22 and 33).

(1) Connect the equipment as shown in figure 22.

(a) Turn the TS-1777/VRM-l selector switch to position 10.

(b) Connect the TS-382F/U and the ME-20 B/U to the TS-1777/VRM-1 test probe.

(c) Make sure the ground lead of the probe is connected to the ground of the TS-382F/U.

(d) Adjust the TS-382 F/U for an output of 225 millivolts (rev) at 1,000 cps as indicated on the ME-30B/U.

(2) Adjust potentiometer R7406 for an indication of approximately +2 volts dc on the ME-26 B/U (connected to P7801-H).

(3) Carefully adjust potentiometer R7406 until a sudden drop in voltage on the ME-26B/U indicates GREEN indicator D67902 has switched on.

(4) Reduce the TS-382F/U output to 0 mv, then slowly increase it; observe the voltage on the ME-30B/U; a sudden drop in voltage measured by the ME-26B/U indicates that GREEN indicator DS7902 has switched on, The indication on the ME-30B/U should be 225 mv.

(5) If necessary readjust potentiometer R7406 to assure the condition given in (4) above.

f. Circuits 5.65-mc.

(1) Remove the TS-382F/U and the ME-30B/U from the TS-1777/VRM-l test probe.

(2) Turn the TS-1777/VRM-l selector switch to position 15.

(3) Connect the Hf Signal Generator 606A and the Rf Millivoltmeter 411A to the TS-1777/VRM-l test probe. Make sure the ground lead of the test probe is connected to the ground of the 606A.

(4) Adjust the 606A for an output of 5.65 mc at 220 mv as indicated on the 411A.

(5) Adjust potentiometer R7708 for an indication of approximately +2 volts dc on the ME-26 B/U (connected to P7801-H).

(6) Carefully adjust potentiometer R7708 until a sudden drop in the voltage measured by the ME-26 B/U indicates that GREEN indicator DS7902 has switched on.

(7) Reduce the 606A output to 0 mv; then slowly increase it. Observe the indication on the 411A; a sudden

drop in voltage *measured* by the ME-26B/U indicates that GREEN indicator DS7902 has switched on. The 411A should idicate 220

(8) If necessary, readjust R7708 to assure *the* condition given in (7) above.

g. Circuits 11.5-mc (fig. 22 and 33).

(1) Reduce the 606A output to 0 volt dc.
(2) Turn the TS-1777/VRM-l selector switch to position 14.
(3) Adjust the 606A for an output of 11.5 mc at 14 mv as indicated by the 411A.
(4) Adjust potentiometer R7611 for an indication of approximately +2 volts dc by the ME-26B/U (connected to P7801-H).
(5) Carefully adjust potentiometer R7611 until a sudden drop in the voltage measured by the ME-26B/U indicates that GREEN indicator lamp DS7902 has switched on.
(6) Reduce the 606A output to 0 mv; then slowly increase it. Observe the voltage indication on the 411A when a sudden drop in the voltage on the ME-26B/U indicates that GREEN indicator DS7902 has switched on. The green indicator should switch on when the 411A indicates 14 mv.
(7) If necessary, readjust R7611 to assure the condition given in (6) above.

h. Circuit 47-mc.

(1) Reduce the 606A output to 0 mv.
(2) Turn the TS-1777/VRM-l selector switch to position 18.
Adjust the 606A for an output of 47 mc at 210 mv as indicated by the 411A.
(4) Adjust potentiometer R7718 for an indication of approximately +1.5 volts dc on the ME-26B/U (connected to P7801-H).
(5) Carefully adjust potentiometer R7718 until a sudden drop in the voltage measured by the ME-26B/U indicates that GREEN indicator DS7902 has switched on.
(6) Reduce the 606A output to 0 mv; then slowly increase it. Observe the voltage on the 411A when a sudden drop in voltage on the ME-26B/U indicates that GREEN indicator DS7902 has switched on. The GREEN indicator should switch on when the 411A indicates 210 mv.
(7) If necessary, readjust R7718 to assure the condition in (6) above.
(8) Reduce the 606A and PP-2309/U outputs to 0 volt, turn all equipment off; remove the TS-1777/VRM-l from the setup, and reassemble it into its case as directed in paragraph 36b.

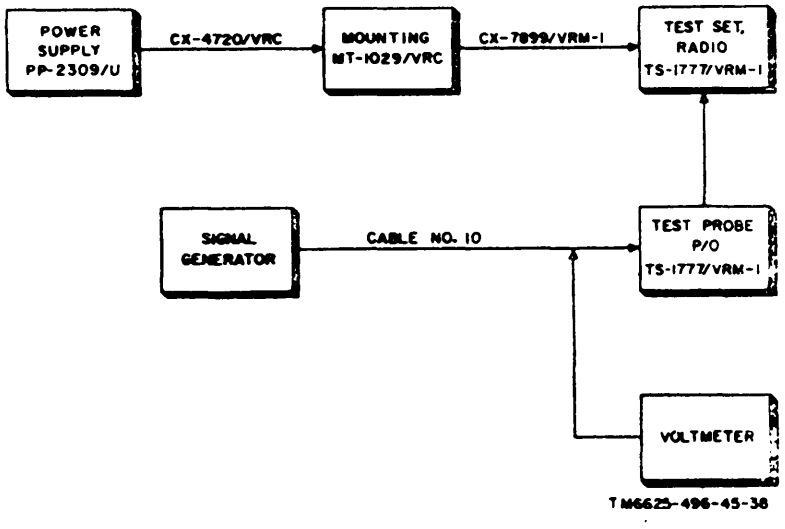


Figure 22. Test setup for final adjustments, block digram.

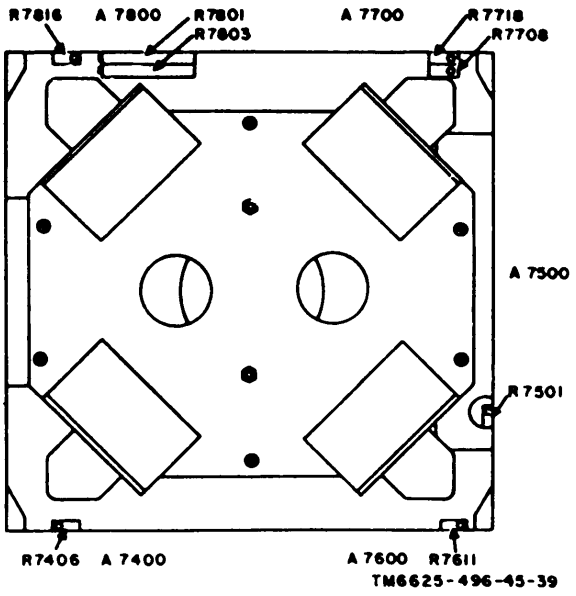


Figure 23. Test Set, Radio TS-1777/VRM-1, location of adjustments.

Section V. FOURTH ECHELON TESTING PROCEDURES

44. General

a. Testing procedures are prepared for use by Signal Field Maintenance Shops and Signal Service Organizations responsible for fourth echelon maintenance of signal equipment to determine the acceptability of repaired signal equipment. These procedures set forth specific requirements that repaired signal equipment *must* meet before it is returned to the using orgauzation. A summary of the performance standards is given in paragraph 52.

b. Comply with the instructions preceding each chart before proceeding to the chart. Perform each test in sequence. Do not vary the *sequence.* For e a c h step, per for m all the actions required in the *Test equipment contro1 settings* and *Equipment under test control settings* columns; then perform each specific test procedure and verify it against its performance standard.

45. Test Equipment, Tools, Materials, and Other Equipment Required

All test equipment, tools, materials, and other equipment required to perform the testing procedures given in this section are listed in the following chart and are authorized under TA 11-17, Signal Field Maintenance Shops, and TA 11-100 (11-17), Allowances of Signal Corps Expendable Supplies for Signal Field Maintenance Shop, Continental United States.

a. Test Equipment.

Nomenclature	Federal stock No.	Technical manual
Audio Oscillator TS-382F/U	6625-091-9489	TM 11-2684
Voltmeter, Electronic ME-30B/U ..	6625-669-0742	TM 11-5132
Frequency Meter AN/USM-26	6625-543-1356	TM 11-5057
Voltmeter TS-443/U	6625-193-7187	TM 11-6625-414-10
Mounting MT-1029/VRC	5820-893-1323	TM 11-5820-401-10
Multimeter ME-26B/U	6625-646-9404	TM 11-6625-200-12

Nomenclature	Federal stock No.	Technical manual
Cable Assembly, Power, Electrical CX-4720/VRC Power Supply PP-2309/U Hf Signal Generator 606A[a] Rf Millivoltmeter 411A[a] Transistor Power Supply 721A[a] Wide-band Amplifier 460AR[a]	5995-823-2726	TM 11-5820-401-10

[a]Hewlett-Packard Co.

b. Tools.

Tool Kit TK-87/U
or
Tool Kit TK-88/U

c. Materials.

Adapter UG-201/U (two)
Adapter UG-274B/U
Cable No. 10 (fig. 21)

46. Physical Tests and Inspection

a. Test Equipment and Material. None.

b. Test Connections and Conditions. Remove cover from TS-1777/VRM-1.

c. Procedure.

Step No.	Test equipment control settings	Equipment under test control settings	Test procedure	Performance standard
1	None	Controls may be in any position.	*a.* Inspect all controls and assemblies on the front panel and in the cover for loose or missing screws.	*a.* Screws will be tight; none missing.
			b. Inspect connector for looseness or damage.	*b.* No looseness or damage evident.
			c. Inspect front panel, case, and cover for damage, missing parts, and condition of finish and panel lettering.	*c.* No damage or missing parts evident. External surfaces intended to be painted will not show bare metal. Panel lettering will be legible.
			Note: Touchup painting is recommended in lieu of refinishing whenever practicable. Screwheads and connectors will not be painted or polished with abrasives.	
			d. Inspect test probe cable for cuts and breaks; inspect condition of test probe tip and ground connector.	*d.* No cuts or breaks evident in test probe cable; test probe tip and ground connector to be secured tightly and undamaged.
			e. Inspect CX-7899/VRM-1 cable for cuts and breaks; inspect its connectors for damage.	*e.* No cuts or breaks evident and connectors of CX-7899/VRC-1 undamaged.
			f. Inspect gasket on cover for cuts or depressions.	*f.* No cuts or depressions on gasket.
2	None	ON-OFF: OFF Selector switch: A	*a.* Set ON-OFF switch to ON	*a.* Switch operates freely.
			b. Turn selector switch through a complete rotation.	*b.* Switch operates freely through each of its 20 detented positions.
3	None	Controls may be in any position.	*a.* Loosen eight captive screws on front panel, remove chassis from case, and inspect chassis for loose or missing screws.	*a.* Screws will be tight; none missing.
			b. Remove four screws each from each of the five plug-in boards; remove plug-in boards from their connectors; and inspect boards and connectors for damage or missing parts.	*b.* No parts missing; connectors should be undamaged.
			c. Inspect switch and back of front panel for missing parts and loose or missing wiring.	*c.* No parts or wiring should be missing; wiring should be soldered tightly in place.
			d. Inspect gasket and bumpers on case for damage or cuts.	*d.* Gasket and bumpers should be undamaged and free of cuts.
			e. Replace five plug-in boards and secure; use four screws each. Replace chassis in case and secure; use eight captive screws.	*e.* None.
4	None	None	Check the AN/VRM-1 for applicable modification work orders.	None.

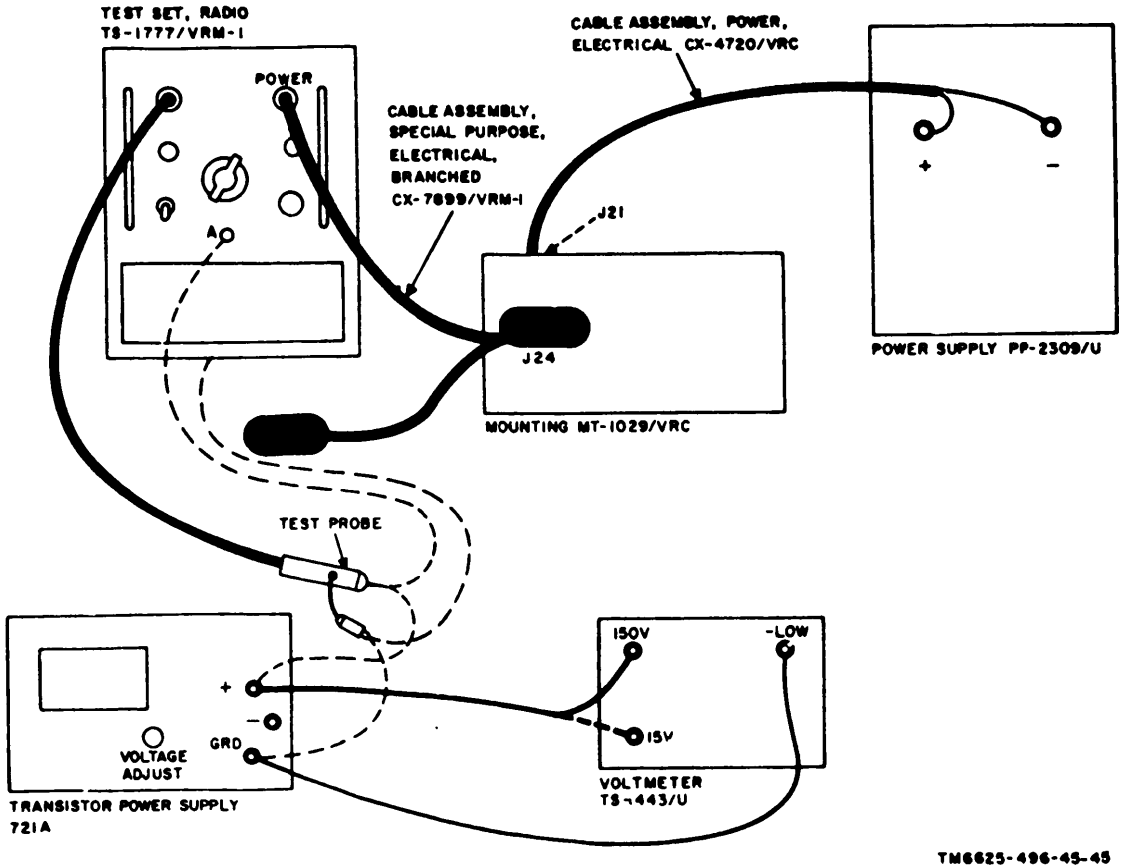


Figure 24. Power tests.

47. Power Tests

a. Test Equipment and Materials.

Cable Assembly, Power, Electrical CX-4720/VRC
Mounting MT-1029/VRC
Voltmeter TS-443/U
Power Supply PP-2309/U
Transistor Power Supply 721A

b. Test Connections and Conditions. Connect the equipment as shown in figure 24. Connect the TS-443/U on the 150-volt range for steps 1 through 3. Connect the TS-443/U on the 15-volt range for step 4. Turn on the equipment and allow it to warm up for 5 minutes before proceeding.

c. Procedure.

Step No.	Test equipment control settings	Equipment under test control settings	Test procedure	Performance standard
1	*PP-2309/U:* Output: 26.0	ON-OFF: ON Selector switch: A	a. Note RED indicator..... b. Insert test probe tip in test jack A	a. RED indicator lights. b. GREEN indicator lights.
2	*PP-2309/U:* 26.0 volts dc *721A:* SHORT CIRCUIT CURRENT: 25 METER RANGE: 30VDC VOLTAGE ADJUST: approximately 7 volts on meter.	Same as step No. 1.	a. Insert test probe tip in + terminal of 721A ... b. Turn 721A VOLTAGE ADJUST to increase output until GREEN indicator lights. Note TS-443/U indication. c. Continue to turn 721A VOLTAGE ADJUST to increase output until RED indicator lights. Note TS-443/U indication.	a. RED indicator lights. b. TS-433/U indicates +14.2 volts. c. TS-443/U indicates +17.6 volts.
3	Same as step No. 2 except: *721A:* VOLTAGE ADJUST: approximately +10 volts on meter.	Same as step No. 1 except: Selector switch: 2	a. Insert test probe tip in + terminal of 721A. Note RED indicator. b. Turn 721A VOLTAGE ADJUST to increase output until GREEN indicator lights. Note TS-443/U indication.	a. RED indicator lights. b. TS-443/U indicates +20.7 volts.
4	Same as step No. 2 except: *721A:* VOLTAGE ADJUST: approximately 5 volts on meter.	Same as step No. 1 except: Selector switch: 8	a. Insert test probe tip in + terminal of 721A. Note RED indicator. b. Turn 721A VOLTAGE ADJUST to increase output until GREEN indicator lights. Note TS-443/U indicator. c. Turn 721A VOLTAGE ADJUST to increase output until RED indicator lights. Note TS-443/U indication.	a. RED indicator lights. b. TS-443/U indicates +10.50 volts. c. TS-443/U indicates +13.00 volts.

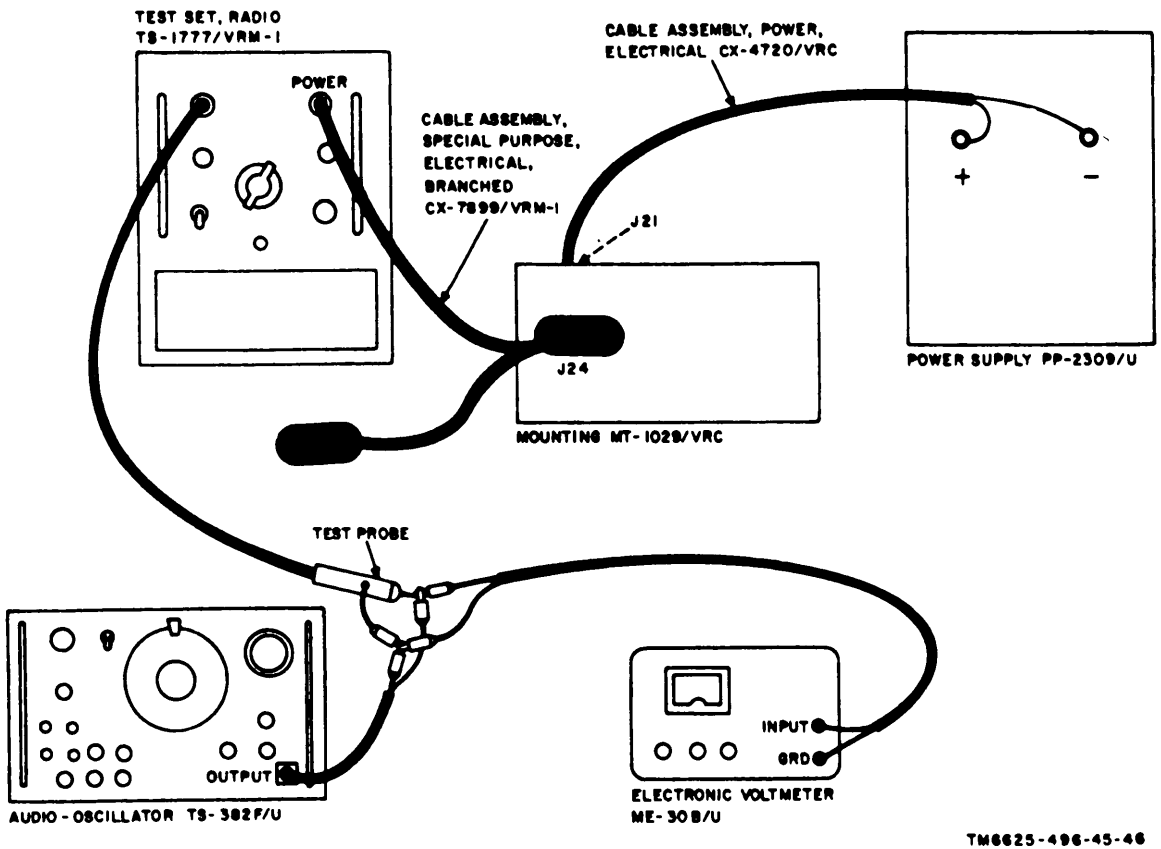


Figure 25. Audio amplifier tests.

48. Audio Amplifier Tests

a. Test Equipment and Materials.
Audio Oscillator TS-382F/U
Cable Assembly, Power, Electrical CX-4720/VRC
Voltmeter, Electronic ME-30B/U
Mounting MT-1029/VRC
Power Supply PP-2309/U

b. Test Connections and Conditions. Connect the equipment as shown in figure 25. Turn on the equipment and allow it to warm up for 5 minutes before proceeding.

c. Procedure.

Step No.	Test equipment control settings	Equipment under test control settings	Test procedure	Performance standard
1	*PP-2309/U* Output: 26.0 volts *TS-382F/U:* FREQUENCY MULTIPLIER: X10 Frequency dial: 100 OUTPUT MULTIPLIER: X1 OUTPUT CONTROL: maximum counterclockwise *ME-30B/U:* Range selector switch: 3 VOLTS	ON-OFF: ON Selector switch: 3	*a.* Adjust TS-382F/U OUTPUT CONTROL for a 1.4-volt indication on ME-30B/U. *b.* Turn TS-382F/U OUTPUT CONTROL to increase output until GREEN indicator lights. Note ME-30B/U indication.	*a.* RED indicator lights. *b.* ME-30B/U indicates 2.85 volts.
2	Same as step No. 1 except: *ME-30B/U:* Range selector switch: 30 VOLTS	Same as step No. 1 except: Selector switch: 4	*a.* Adjust TS-382F/U OUTPUT CONTROL for a 7-volt indication on ME-30B/U. *b.* Turn TS-382F/U OUTPUT CONTROL to increase output until GREEN indicator lights. Note ME-30B/U indication.	*a.* RED indicator lights. *b.* ME-30B/U indicates 13.3 volts.
3	Same as step No. 1 except: *ME-30B/U:* Range selector switch: 1 VOLTS	Same as step No. 1 except: Selector switch: 5	*a.* Adjust TS-382F/U OUTPUT CONTROL for a 0.25-volt indication on ME-30B/U. *b.* Turn TS-382F/U OUTPUT CONTROL to increase output until GREEN indicator lights. Note ME-30B/U indication.	*a.* RED indicator lights. *b.* ME-30B/U indicates 0.49 volt.
4	Same as step No. 1 except: *ME-30B/U:* Range selector switch: 1 VOLTS	Same as step No. 1 except: Selector switch: 6	*a.* Adjust TS-382F/U OUTPUT CONTROL for a 0.45-volt indication on ME-30B/U. *b.* Turn TS-382F/U OUTPUT CONTROL to increase output until GREEN indicator lights. Note ME-30B/U indication.	*a.* RED indicator lights. *b.* ME-30B/U indicates 0.90 volt.
5	Same as step No. 1 except: *ME-30B/U:* Range selector switch: .3 VOLTS	Same as step No. 1 except: Selector switch: 10	*a.* Adjust TS-382F/U OUTPUT CONTROL for a 0.11-volt indication on ME-30B/U. *b.* Turn TS-382F/U OUTPUT CONTROL to increase output until GREEN indicator lights. Note ME-30B/U indication.	*a.* RED indicator lights. *b.* ME-30B/U indicates 0.225 volt.
6	Same as step No. 1 except: *ME-30B/U:* Range selector switch: 10 volts	Same as step No. 1 except: Selector switch 11	*a.* Adjust TS-382F/U OUTPUT CONTROL for a 3.2-volt indication on ME-30B/U. *b.* Turn TS-382F/U OUTPUT CONTROL to increase output until GREEN indicator lights. Note ME-30B/U indication.	*a.* RED indicator lights. *b.* ME-30B/U indicates 6.40 volts.

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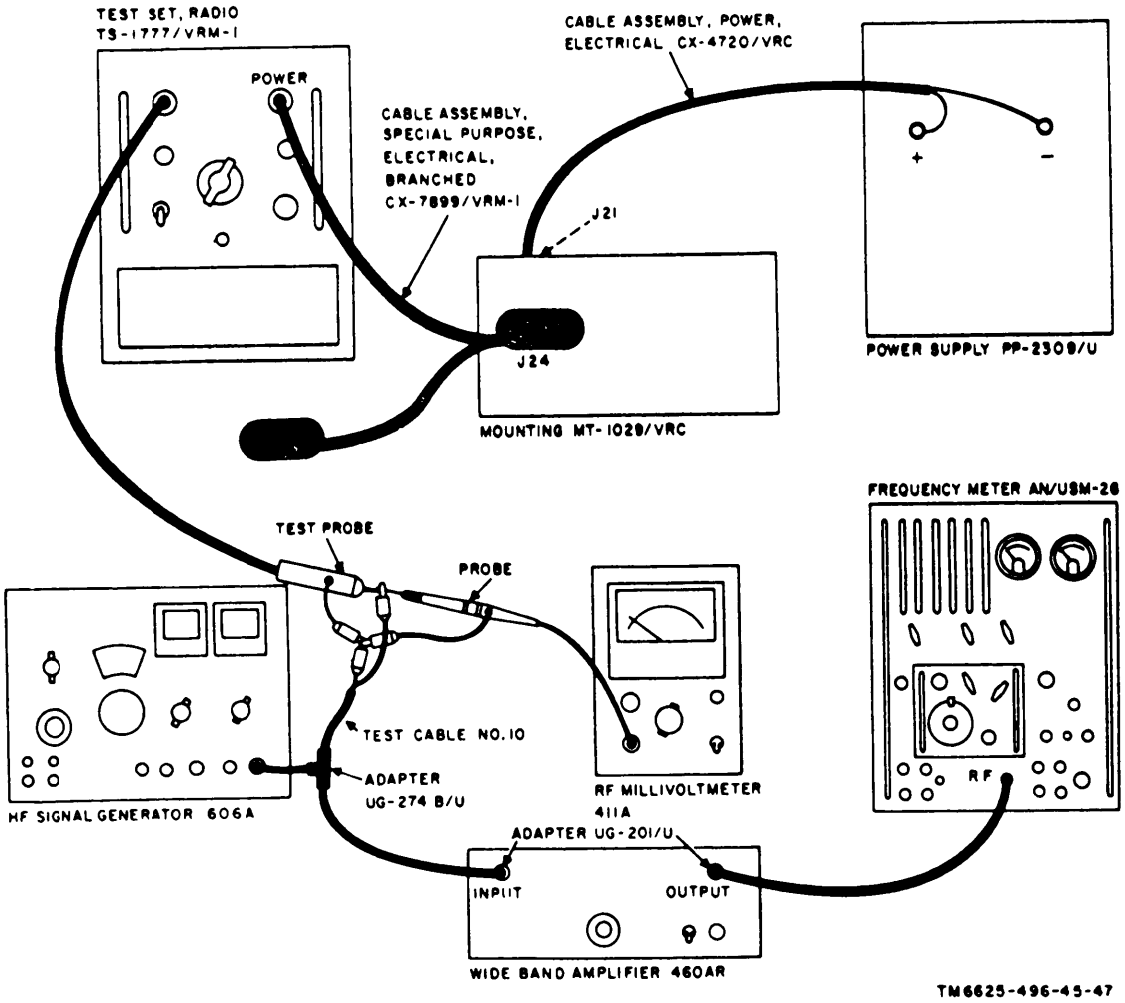

Figure 26. 5.65-mc amplifier tests.

49. 5.65-Mc Amplifier Tests

a. Test Equipment and Materials.
Cable Assembly, Power, Electrical CX-4720/VRC
Frequency Meter AN/USM-26 (Frequency Meter FR-38D/U with Frequency Converter Unit MX-1637/U installed)
Hf Signal Generator 606A
Mounting MT-1029/VRC
Power Supply PP-2309/U
Rf Millivoltmeter 411A
Wide-band Amplifier 460AR
Adapter UG-201/U (two required)
Adapter UG-274B/U
Cable No. 10 (fig. 21)

b. Test Connections and Conditions. Connect the equipment as shown in figure 26. Turn on the equipment and allow it to warm up for 5 minutes.

c. Procedure.

Step No.	Test equipment control settings	Equipment under test control settings	Test procedure	Performance standard
1	*PP-2309/U:* Output: 26.0 *AN/USM-26:* TIME UNIT: EXT FUNCTION SELECTOR: FREQUENCY FREQUENCY UNIT: 1 MIXING FREQUENCY MCS: 0 RANGE-MC: 10-20 TUNING: 10 GAIN: MAX *606A:* RANGE: 1.76 MC-6.0 MC FREQUENCY: 5.65 MODULATION SELECTOR: CW ATTENUATOR: 1 VOLTS CRYSTAL CALIBRATOR: OFF *411A:* RANGE: .3 VOLTS	ON-OFF: ON Selector switch: 12	*a.* Adjust 606A frequency VERNIER for a 5,649,900- to 5,650,100-cps indication on the AN/USM-26. *b.* Adjust 606A output VERNIER for a 0.09-volt indication on the 411A. *c.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* None. *b.* RED indicator lights. *c.* 411A indicates 0.180 volt.
2	Same as step No. 1 except: *411A:* RANGE: 1 VOLTS	Same as step No. 1 except: Selector switch: 15	*a.* Adjust 606A frequency VERNIER for 5.65-mc indication on the AN/USM-26. *b.* Adjust 606A output VERNIER for a 0.11-volt indication on the 411A. *c.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* None. *b.* RED indicator lights. *c.* 411A indicates 0.220 volt.
3	Same as step No. 1 except: *411A:* RANGE: 1 VOLTS	Same as step No. 1 except: Selector switch: 16	*a.* Adjust 606A frequency VERNIER for 5.65-mc indication on the AN/USM-26. *b.* Adjust 606A output VERNIER for a 0.24-volt indication on the 411A. *c.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indicator.	*a.* None. *b.* RED indicator lights. *c.* 411A indicates 0.480 volt.
4	Same as step No. 1 except: *411A:* RANGE: 1 VOLTS	Same as step No. 1 except: Selector switch: 17	*a.* Adjust 606A frequency VERNIER for 5.65-mc indication on the AN/USM-26. *b.* Adjust 606A output VERNIER for a 0.36-volt indication on the 411A. *c.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* None. *b.* RED indicator lights. *c.* 411A indicates 0.720 volt.

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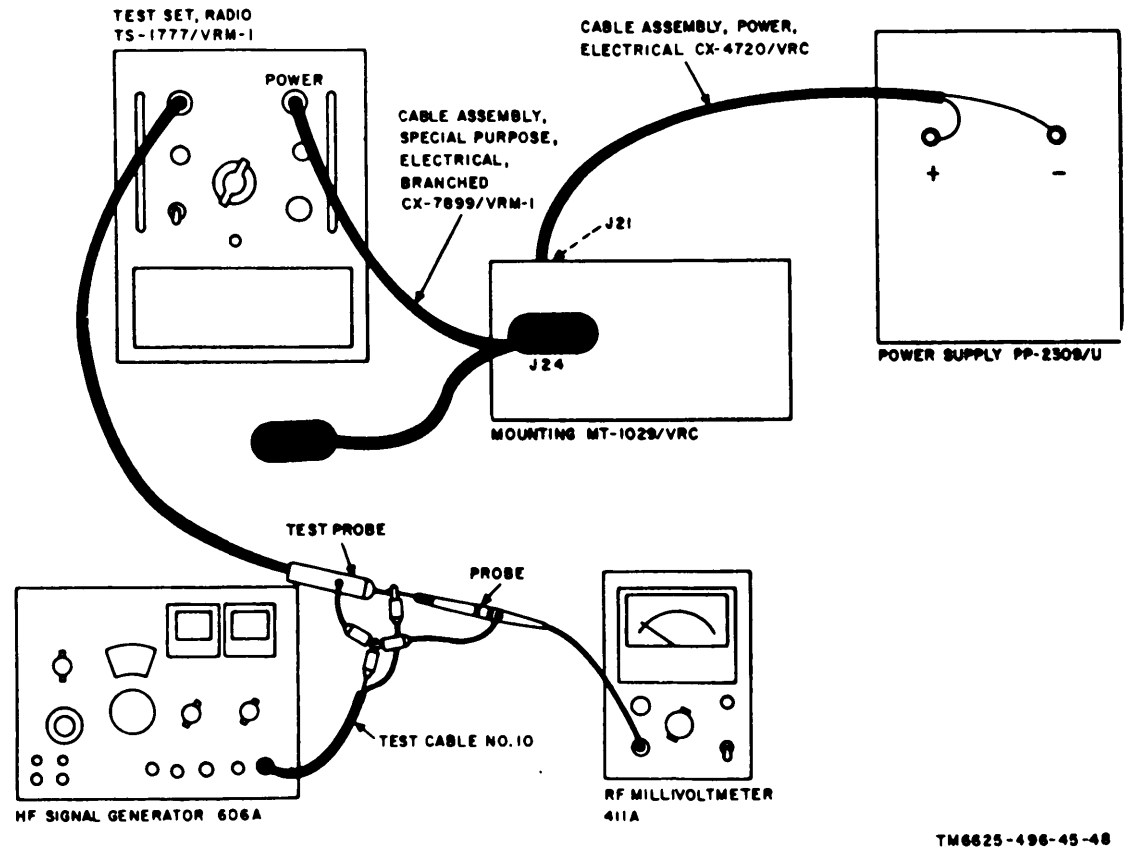


Figure 27. 11.6-mc amplifier tests.

50. 11.5-Mc Amplifier Tests

a. Test Equipment and Materials.

Cable Assembly, Power, Electrical CX-4720/VRC
Mounting MT-1029/VRC
Power Supply PP-2309/U
Rf Millivoltmeter 411A
Hf Signal Generator 606A
Cable No. 10 (fig. 21)

b. Test Connections and Conditions. Connect equipment as shown in figure 27. Turn on the equipment and allow it to warm up for 5 minutes.

c. Procedure.

Step No.	Test equipment control settings	Equipment under test control settings	Test procedure	Performance standard
1	*PP-2309/U:* Output: 26.0 *606A:* RANGE: 5.8 MC-19.2 MC FREQUENCY: 11.5 MODULATION SELECTOR: CW ATTENUATOR: 3 VOLTS CRYSTAL CALIBRATOR: OFF *411A:* RANGE: .3 VOLTS	ON-OFF: ON Selector switch: 7	*a.* Adjust 606A output VERNIER for a 0.13-volt indication on the 411A. *b.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* RED indicator lights. *b.* 411A indicates 0.27 volt.
2	Same as step No. 1	Same as step No. 1 except: Selector switch: 9	*a.* Adjust 606A output VERNIER for a 0.06-volt indication on the 411A. *b.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* RED indicator lights. *b.* 411A indicates 0.130 volt.
3	Same as step No. 1	Same as step No. 1 except: Selector switch: 13	*a.* Adjust 606A output VERNIER for a 0.11-volt indication on the 411A. *b.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* RED indicator lights. *b.* 411A indicates 0.225 volt.
4	Same as step No. 1 except: *606A:* ATTENUATOR: .03 VOLTS *411A:* RANGE: .03 VOLTS	Same as step No. 1 except: Selector switch: 14	*a.* Adjust 606A output VERNIER for a 0.007-volt indication on the 411A. *b.* Turn 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* RED indicator lights. *b.* 411A indicates 0.014 volt.

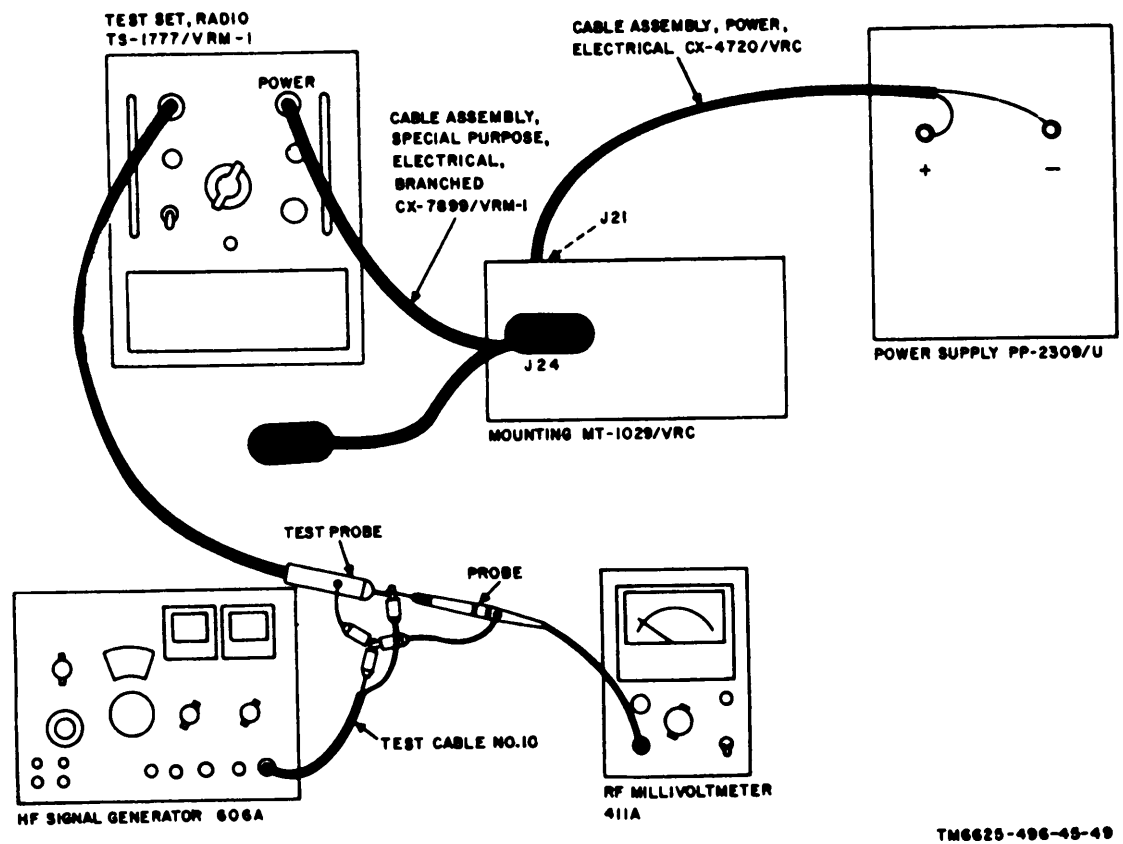


Figure 28. 47.0-mc amplifier test.

51. 47.0-Mc Amplifier Test

a. Test Equipment and Materials.

Cable Assembly, Power, Electrical CX-4720/VRC
Mounting MT-1029/VRC
Power Supply PP-2309/U
Rf Millivoltmeter 411A
Hf Signal Generator 606A
Cable No. 10 (fig. 21)

b. Test Connections and Conditions. Connect equipment as shown in figure 28. Turn on the equipment and allow it to warm up for 5 minutes.

c. Procedure.

Step No.	Test equipment control settings	Equipment under test control settings	Test procedure	Performance standard
	PP-2309/U: Output: 26.0 *606A:* RANGE: 19 MC-65MC FREQUENCY: 47.0 MODULATION SELECTOR: CW ATTENUATOR: .3 VOLTS CRYSTAL CALIBRATOR: OFF *411A:* RANGE: .3 VOLTS	ON-OFF: ON Selector switch: 18	*a.* Adjust 606A output VERNIER for a 0.10-volt indication on the 411A. *b.* Turn the 606A output VERNIER to increase output until GREEN indicator lights. Note 411A indication.	*a.* RED indicator lights. *b.* 411A indicates 0.210 volt.

52. Summary of Test Data

Personnel may find it convenient to arrange data in a manner similar to that shown below. An "X' in the Indicator column indicates the indicator designated is lighted.

Selector switch S7902 position	TEST SET, RADIO AN/VRM-1			Indicator	
	Signal at test probe tip			RED	GREEN
	Type	Frequency	Voltage		
A	(Note 1)	-	-	X	
	(Note 2)	-	-		X
	dc	-	+7.0	X	
	dc	-	+14.2		X
	dc	-	+17.6	X	
2	dc	-	+10.0	X	
	dc	-	+20.7		X
3	af	1 kc	1.4	X	
	af	1 kc	2.85		X
4	af	1 kc	7.0	X	
	af	1 kc	13.3		X
5	af	1 kc	0.25	X	
	af	1 kc	0.49		X
6	af	1 kc	0.45	X	
	af	1 kc	0.90		X
7	rf	11.5 mc	0.13	X	
	rf	11.5 mc	0.27		X
8	dc	-	+5.0	X	
	dc	-	+10.50		X
	dc	-	+13.00	X	
9	rf	11.5 mc	0.06	X	
	rf	11.5 mc	00.130		X
10	af	1 kc	0.11	X	
	af	1 kc	0.225		X
11	af	1 kc	3.2	X	
	af	1 kc	6.4		X
12	rf	5.65 mc	0.09	X	
	rf	5.65 mc	0.180		X
13	rf	11.5 mc	0.11	X	
	rf	11.5 mc	0.225		X
14	rf	11.5 mc	0.007	X	
	rf	11.5 mc	0.014		X
15	rf	5.65 mc	0.11	X	
	rf	5.65 mc	0.220		X
16	rf	5.65 mc	0.24	X	
	rf	5.65 mc	0.480		X
17	rf	5.65 mc	0.36	X	
	rf	5.65 mc	0.72		X
18	rf	47.0 mc	0.10	X	
	rf	47.0 mc	0.210		X

Notes:
1. ON-OFF switch at ON.
2. Test probe tip in test jack A.

CHAPTER 3

FIFTH ECHELON MAINTENANCE

Section I. TROUBLESHOOTING AND REPAIR

53. General

This chapter includes troubleshooting and repair procedures to be performed by fifth echelon maintenance facilities. It includes detailed isolation, replacement, and adjustment data for the plug-in assemblies. Chapter 4 includes fifth echelon final testing procedures.

54. Plug-In Assembly Repair Procedures

a. General. The plug-in assembly repair procedures direct the isolation and repair of trouble in these assemblies. Tests and alignment are included in the procedures. A separate procedure is provided for each plug-in assembly. Each procedure consists of preparation, tests, and isolation steps. The preparation steps detail the connection of test equipment and special test cables. The tests indicate the nature of the trouble. In the isolation steps, the faulty part is identified. The tests preceding isolation depend on plug-in assembly terminal voltage measurements to disclose the nature of the trouble. Voltage measurements are taken at circuit points between the plug-in assembly terminals to isolate the faully part.

b. Preparation.

(1) A TS-1777/VRM-l known to be good is used as a test fixture. The plug-in assembly to be tested is connected, through cable No. 11 (fig. 21), in place of the equivalent assembly in the TS-1777/VRM-1. The test equipment is connected to the connectors or other points specified to establish the proper connections for tests and faulty parts isolation. In general, additional connections or changes to connections will riot be required. The plug-in assembly to be tested is provided with the proper terminals by other plug-in assemblies.

(2) In addition to the listed test equipment, cables No. 10 and 11 (fig. 21) are required.

(3) When the frequency of a signal generator is specified without an accompanying tolerance, set the frequency to the number of significant figures expressed. For example, 11.500 mc is set to an accuracy of five figures.

Caution: Always remove the test signal *from the* test probe before removing power from the TS-1777/VRM-1.

Test equipment	Technical manual
Audio Oscillator TS-382F/U ..	TM 11-2684
Cable Assembly, Power, Electrical CX-4720/VRC	TM 11-5820-401-10
Voltmeter TS-443/U	TM 11-6625-414-10
Voltmeter, Electronic ME-30B/U	TM 11-5132
Frequency Meter AN/USM-26.	TM 11-5057
Mounting MT-1029/VRC.....	TM 11-5820-401-10
Multimeter ME-26B/U	TM 11-6625-200-12
Power Supply PP-2309/U.....	
Hf Signal Generator 606A (Hewlett-Packard Co.)	
Rf Millivoltmeter 411A (Hewlett-Packard Co.)	
Wide-band Amplifier 460AR (Hewlett-Packard Co.)	
Transistor Power Supply 721A (Hewlett-Packard Co.)	

C. *Tests.*

(1) Tests are performed following the preparation to disclose the nature of the trouble. The tests compare present performance of the circuit functions with original acceptance levels including the alignment of individual components.

(2) The tests will disclose the loss of any of the plug-in assembly circuit functions. If loss of function or

near normal operations encountered, faully parts isolation procedure will be specified. The test results, which are recorded i n various test steps, are compared to a normal indication. All of the conditions included must be satisfied before a normal indication has occurred. If a normal indication is obtained in the first test, the second test will be performed. This process continues, with successive normal indications, until the final test normal indication is obtained.

(3) Do not attempt very small angular adjustments on variable transformers or coils. The slug is secured with a semirigid cement and may spring back and thus nullify the adjustment. Turn the adjustment at least one-half-turn and return to the initial setting and proceed from there as required. When the alignment is completed, use a fine camel's-hair brush and brush Minnesota Mining and Manufacturing type EC-800 cement or equivalent on the threads to secure the slug. Apply the cement vertically across the threads and onto the case at three equally spaced positions.

(4) After the maintenance has been completed, remove the plug-in assembly from the TS-1777/VRM-l and replace the original good plug-in assembly. Before attempting final testing of a repaired AN/ VRM-1, perform the adjustment procedures s p e c i f i e d in paragraphs 41 through 43.

d. Isolation.

(1) Isolation is the process wherein faulty parts are located and subsequently replaced. An externally generated test signal is supplied to the module, and signal voltage measurements are taken at selected circuit points. Typical signal voltages are listed for those circuit locations to provide information concerning the n o r m a 1 presence or absence of signal and the magnitude to be expected. A listing of dc voltage is also included to supplement the information provided by the signal voltages. The order of the dc voltage list follows the dc distribution route in the plug-in assembly circuit.

(2) Except for inductor L7401 inplug-in assembly A7400, all transformer windings and coils used in the TS-1777/VRM-l have dc resistances of less than 1 ohm. Inductor L7401 has a dc resistance of 800 ohms .

55. Isolating Troubles in Assembly A7400

Refer to figure 39 for circuit details and figure 29 for aid in locating the parts.

a. Preparation.

(1) Connect the equipment as described in paragraph 32.

(2) Set TS-1777/VRM-l selector switch S7902 to *position* 10.

(3) Adjust the TS-382F/U for a frequency of 1,000 cps with an output of O volt and connect it to the test probe.

(4) Connect the ME-30 B/U to connector P7401-M.

(5) Connect the ME-26 B/U to connector P7801-H and adjust it to indicate + volts dc on the 30-volt scale.

b. Gain Test.

(1) Adjust the TS-382 F/U output for an ME-30 B/U indication of 50 mv.

(2) Adjust potentiometer R7406 for a maximum indication on the ME-26B/U. A normal indication should be +4.0 dc minimum.

(3) Increase the TS-382F/U output to 100 mv as indicated on the ME-30B/U. A normal indication should be +5.5 volts dc minimum.

(4) If the indications obtained in (2) or (3) above are low or absent, proceed to d below.

c. *Bandwidth Test.*

(1) Adjust the TS-382F/U for an ME-30 B/U indication of 50 mv.

(2) Adjust potentiometer R7406 for an ME-26B/U indication of +3 volts dc.

(3) Adjust the TS-382F/U frequency to 100 cps while maintaining an ME-30 B/U indication of 50 mv. A normal indication should be +1.5 volts dc ±0.4.

(4) Adjust the TS-382F/U frequency to 3,000 cps while maintaining an ME-30 B/U indication of 50 mv. A normal indication should be +3.0 volts dc ±0.4.

(5) If the indications obtained in (3) and (4) above are normal, trouble isolation is complete.

(6) If the indications obtained in (3) or (4) above are low, proceed to *d* below.

d. Isolation.

(1) Adjust the TS-382F/U for a frequency of 1,000 cps at a level of 160 mv as indicated on the ME-30B/U.

(2) Measure the listed signal and dc voltages given in the chart below to isolate the faulty part. Measure the ac voltages with an ME-30B/U; measure the dc voltages with an ME -26B/U.

(a) Signal voltage chart.

Circuit junction	Signal Voltage (rms)
P7401-M	160 mv
Q7401 base	160 mv
Q7401 emitter	160 mv
Q7402 base	10 mv
Q7402 collector	2.5 v
Q7403 base	9 mv

(b) Dc voltage chart.

Circuit junction	+dc voltage to ground (Volts)
P7401-H	16
Q7401 base	8.95
Q7401 emitter	8.4
Q7402 base	13.8
Q7402 collector	6.0
Q7403 base	14.0
Q7403 emitter	14.1
P7401-K	2.0 (rectified signal)

(3) Remove the test signal and set the TS-1777/VRM-1 ON-OFF switch to OFF.

(4) Replace the faulty part.

(5) Repeat *b* and c above.

56. Isolating Troubles in Assembly A7500

Refer to figure 39 for circuit details and figure 30 for test point and parts location.

a. *Checking Inductor L7501, Potentiometer R7501, and Capacitor C7503.*

(1) Remove assembly A7500 from the TS-1777/VRM-l.

(2) Check the continuity of inductor L7501, potentiometer R750.1, and capacitor C7501 to locate the faulty part.

b. Filter FL7501 Insertion Loss.

(1) *Connect* a *50-ohm* ±5-percent, 1-watt, composition resistor between connector P7501-C and P7501-D.

(2) Connect Hf Signal Generator output terminals and the input terminals of Wide Band Amplifier 460AR and Rf Millivoltmeter 411A between connector P7501-M and P7501-L.

(3) Connect the AN/USM-26 to the 460AR.

(4) Adjust the 606A output frequency to 5.65 mc ±100 cps as indicated on the AN/USM-26 for a 0-db indication on the 411A.

(5) Move the 411A to connector P7501-C and P7501-D, and record the db indication. A normal indication noted should be an insertion loss of 6 db or less.

(a) If the indication obtained exceeds the 6-db insertion loss, replace filter FL7501.

(b) If *the* indication is normal, proceed to c below.

c. *Filter FL7501 Bandwidth.*

(1) Per for m the procedures given in b(l) through (3) above.

(2) Adjust the 606A output frequency to 5.6555 mc to ±100 cps as indicated by the AN/USM-26 and for a 0-db indication on the 411A.

(3) Move the 411A to *connector* P7501-*C* and P7501-D. The normal indication should be less than 6 db down.

(4) Move the 411A to connector P7501-M and P5701-L and adjust the 606A frequency to 5.6554 mc ±100 cps as indicated by the AN/USM-26 and for a 0-db indication on the 411A.

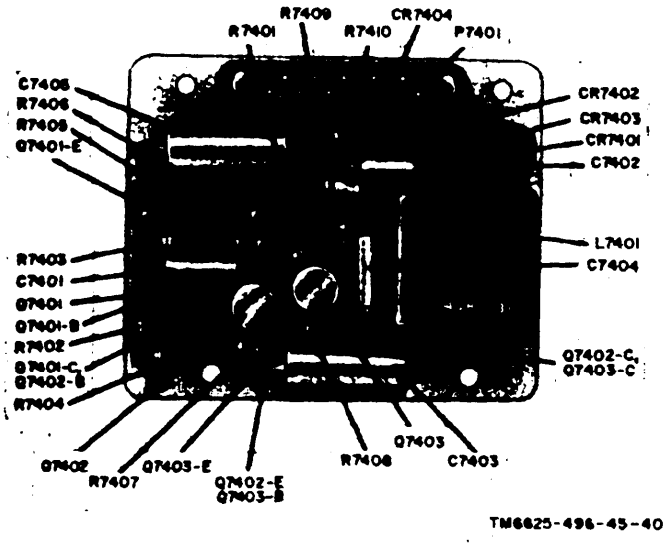


Figure 29. Assembly A7400, parts location..

(5) Move the 411A to connector P7501-C and P5701-D. The normal indication should be less than 3 db

(6) Move the 411A to connector P7501-M and P7501-L and adjust the 666A output frequency to 5.6446 mc ±100 cps as indicated by the AN/USM-26 and for a 0-db indication on the 411A.

(7) Move the 411A to connector P7501-C and P7501-D. The normal indication should be less than 3 db down.

(8) Move the 411A to connector P7501-M and P7501-L and adjust the 606A output frequency to 5.6434 mc ±100 cps as indicated by the AN/USM-26 and for 0-db indication on the 411A.

(9) Move the 411A to connector P7501-C and P7501-D. The normal indication should be less than 6db down.

(10) If the indication obtained in (3), (5), (7), or (9) above are not normal, replace filter FL7501.

(11) If the indications obtained in (3), (5), (7), or (9) above are normal, trouble isolation in assembly A7500 is complete.

57. Isolating Troubles in Assembly A7600

Refer to figure 39 for circuit details — and figure 31 for test point and parts location.

a. Preparation.

(1) Set TS-1777/VRM-l selector switch S7902 to position 14.

(2) Connect Hf Signal Generator 606A to the test probe, and adjust for an output frequency of 11.500 mc at 0 volt.

(3) Connect Rf Millivoltmeter 411A to connector P7601-C.

(4) Connect the ME-26B/U to connector P7801-H and adjust it to indicate + volts dc on the 30-volt scale.

b. *Gain Test.*

(1) Adjust the 606A output for a 411A indication of 10 mv.

(2) Adjust potentiometer R7611 for a maximum indication on the ME-26B/U.

(3) Adjust transformers T7601 and T7602 and inductor L7603 for a

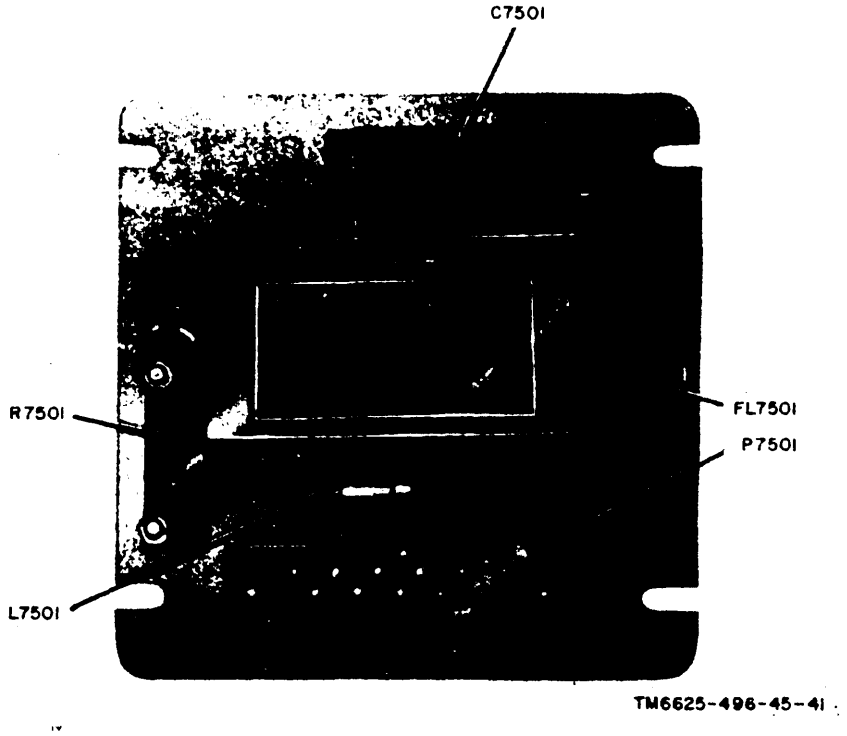


Figure 30. Assembly A 7600, parts location

maximum indication on the ME-26B/U and record the indication.

(4) Increase the 606A output to 20 mv as indicated on the 411A. Record the ME-26B/U indication.

(5) A normal indication, noted in (3) above, should be +4.0 volts dc

(6) A normal indication, noted in (4) above, should be + 5.5 volts dc minimum.

(7) If the indications obtained are low or absent, proceed to *d* below.

c. Bandwidth *Test.*

(1) Adjust the 606A for a 411A indication of 10 mv.

(2) Adjust potentiometer R7611 for an ME-26B/U indication of +3 volts dc.

(3) Adjust the 606A output frequency to 10.500 mc and adjust the output level to maintain a 411A indication 10 mv. A normal indication should be +1.0 volts dc ±0.30.

(4) Adjust the 606 A frequency to 13.000 mc while maintaining a 411A indication of 10 mv. A normal indication should be +1.0 volts dc ±0.30.

(5) If the indications obtained in (3) and (4) above are normal, trouble isolation in assembly A7600 is complete.

(6) If indications obtained in (3) and (4) above are low, proceed to *d* below.

d. Isolation.

(1) Adjust the 606A for a frequency of 11.500 mc at a level of 4.9 mv as indicated on the 411A.

(2) Measure the listed typical signal and dc voltage in the Chart below to isolate the faulty part. Measure the ac voltages with an ME-30B/U; measure the dc voltage with an ME-26B/U.

(a) Signal voltage chart.

Circuit junction	Signal voltage (rms)
P7601-C	4.9 mv
C7601 and T7601	3.0 mv
T7601 and C7603	5.7 mv
Q7601 base	5.6 mv
T7602 and C7609	5.6 mv
R7605 and R7606	17.0 mv
T7602 and C7610	33.0 mv
Q7602 base	34.0 mv
Q7602 collector	2.5 v
R7606 and C7611	27.5 mv

(b) Dc voltage chart.

Circuit junction	+dc voltage to ground (volts)
P7601-H	15.3
C7604 and R7603	16.3
Q7601 base	5.35
Q7601 emitter	5.55
R7605 and R7606	8.0
Q7602 base	7.6
Q7602 emitter	7.66
R7608 and C7611	8.0
CR7602 and R7611	3.1 (rectified signal)
P7601-K	2.0 (rectified signal)

(3) Remove the test signal and set the TS-1777/VRM-l ON-OFF switch to OFF.
(4) Replace the faulty part.
(5) Repeat *b and c above.*

58. Isolating Troubles in Assembly A7700

Refer to figure 39 for circuit details and figure 32 for aid in locating the parts.

a. Preparation for 5.65-Mc Amplifier Tests.

(1) Set TS-1777/VRM-1 selector switch S7902 to position 15.
(2) Adjust Hf Signal Generator 606A for a frequency of 5.650 mc with an output of O volt and connect it to the test probe.
(3) Connect Rf Millivoltmeter 411A to connector P7701-M.
(4) Connect the ME-26B/U to connector P7801-H and adjust to indicate + volts dc on the 30-volt scale.

b. Gain Test for 5.65-Mc Amplifier.

(1) Adjust the 606A output for a 411A indication of 150 mv.
(2) Adjust potentiometer R7708 for a maximum indication on the ME-26B/U.
(3) Adjust inductor L7704 for a maximum indication on the ME-26B/U. A normal indication should be +3.2 volts dc minimum.
(4) Increase the 606A output to 300 mv as indicated on the 411A. A normal indication should be +4.5 volts dc minimum.
(5) If the indication obtained in (3) and (4) above are low or absent, proceed to *d* below.

c. Bandwidth Test *for* 5.65-Mc *Amplifier.*

(1) Adjust the 606A for a 411A indication of 150 mv.
(2) Adjust potentiometer R7708 for an ME-26B/U indication of +3 volts dc.
(3) Adjust the 606A frequency to 4.600 mc and adjust the output level to maintain a 411A indication of 150 mv. A normal indication should be +1.5 volts dc ±0.3.
(4) Adjust the 606A frequency to 6.8. mc and adjust the output level to maintain a 411A indication of 150 mv. A normal indication on the ME-26 B/U should be +1.5 volts dc ±0.3.
(5) If indications obtained in (3) and (4) above are normal, proceed to e below.
(6) If indications obtained in (3) and (4) above are low, proceed to *d* "below.

d. Trouble Isolation in 5.65-Mc Amplifier.

(1) Adjust the 606A for a frequency of 5.650 mc at a level of 18 mv as indicated on the 411A.
(2) Measure the signal and dc voltages listed in the chart below to isolate the faulty part. Measure the ac voltages with an ME-30B/U; measure the dc voltages with an ME-26B/U.

(a) Signal voltage chart.

Circuit junction	Signal Voltage (rms)
P7701-M	81mv
R7703 and c7701	15.55 mv
Q7701 emitter	17.5 mv
Q7701 collector	1.75 v

(b) Dc voltage chart.

Circuit junction	+dc Voltage to ground (volts)
P7701-L	16.0
L7701 and C7702	14.8
Q7701 emitter	6.95
Q7701 base	6.75
CR7701 and R7708	2.9 (rectified signal)
P7701-J	2.0 (rectified Signal)

(3) Remove the test signal and set the TS-1777/VRM-1 ON-OFF switch to OFF.

(4) Replace the faulty part.

(5) Repeat *b* and c above.

e. *Preparation for 47-Mc Amplifier Tests.*

(1) Set TS-1777/VRM-l selector switch S7 902 to position 18.

(2) Adjust the 606A for a frequency of 47.000 mc with an output of 0 volt and connect it to the test probe.

(3) Connect the 411A to connector P7701-B.

(4) Connect the ME-26B/U to connector P7801-H and adjust to indicate + volts dc on the W-volt scale.

f. Gain Test for 47-Mc Amplifier.

(1) Adjust the 607A output for a 411A indication of 200 mv.

(2) Adjust potentiometer R7718 for a maximum indication on the ME-26B/U.

(3) Adjust capacitor C7708, transformer T7702, and inductor L6705 for a maximum indication on the ME-26B/U. A normal indication should be +3.0 volts dc minimum.

(4) Increase the 606A output to 300 mv as indicated on the 411A. A normal indication should be +4.0 volts dc minimum.

(5) If the indications obtained in (3) or (4) above are low or absent, proceed to *h* below.

g. Bandwidth Test for 47-Mc Amplifier.

(1) Adjust the 606A for a 411A indication of 200 mv.

(2) Adjust potentiometer R7718 for an ME-26 B/U indication of +3 volts dc.

(3) Adjust the 606A frequency to 42.00 mc and adjust the output level to maintain a 411A indication of 200 mv. Record the ME-26B/U indication.

(4) Adjust the 606A frequency to 54.00 mc and adjust the output level to maintain a 411A indication of 200 mv. Record the ME-26B/U indication.

(5) A normal indication, noted in (3) above, should be +1.0 volt dc ±0.25.

(6) A normal indication, noted in (4) above is +1.0 volt dc ±0.25.

(a) If indications obtained are normal, trouble isolation in assembly A7700 is complete.

(b) If " indications are low, proceed to h below.

h. Trouble Isolation in 47-Mc Amplifier.

(1) Adjust the 606A for a frequency of 47.000 mc at a level of 165 mv as indicated on the 411A.

(2) Measure the listed typical signal and dc voltages listed in the charts below to isolate the faulty part. Measure the ac voltages with an ME-30B/U; measure the dc voltages with an ME-26B/U.

(a) Signal voltage chart.

Circuit junction	Signal Voltage (rms)
P7701-B	165 Mv
Q7702 base	165 mv
Q7702 emitter	120 mv
Q7702 collector	680 mv
T7702 and C77109	150 mv
Q7703 *emitter*	165 mv
Q7703 collector	1.74.V
C7712 and CR7702	1.72 V

(b) Dc voltage chart.

Circuit junction	+dc voltage to ground (volts)
P7701-D	15.2
C7710 and R7913	15.15
Q7702 base	6.2
Q7702 emitter	6.5
R7912 and R7913	7.25
Q7703 collector	16.1
Q7703 base	7.45
Q7703 emitter	6.7
P7701-F	200 (rectified signal)

(3) Remove the test signal and set the TS-1777/VRM-l ON-OFF switch to OFF.
(4) Replace the faulty part.
(5) Repeat *f* and *g* above.

59. Isolating Trouble in Assembly A7800

Refer to figure 39 for circuit details and figure 33 for aid in locating the parts.

a. *Line Voltage Sensing Circuit Test.*
(1) Reduce the PP-2309/U output voltage to o volt dc
(2) Perform adjustment procedure for the line voltage sensing circuit given in paragraph 43 *b*.
(3) *If the* circuit does not adjust properly, proceed to *b* below.
(4) If the circuit does adjust properly, proceed to *c* below.

b. Line Voltage Sensing Circuit Isolation.
(1) Adjust the PP-2309/U output voltage to 25 volts dc.
(2) Measure the dc voltages listed in the chart below with an ME-26 B/U to isolate the faulty part.

Circuit junction	+dc voltage to ground (volts)
P7801-B	25
Q7806 *emitter*	11.3
Q7806 base 1	7.9
17801-C	15. 7
R7819 and C7802	15.3
P7801-A	15.0

(3) Reduce the PP-2309/U output to 0 volt dc and replace the faulty part.
(4) Repeat *a above.*

c. Schmitt Trigger Test.
(1) *Connect* Transistor Power Supply 721A and the TS-443/U to the test probe and adjust for an output of 0 volt.
(2) Turn TS-1777/VRM-l selection switch S7902 to position 2.
(3) Adjust the PP-2309/U output voltage to 26 volts dc.
(4) Increase the 721A output slowly to +30 volts dc; observe the voltage on the TS-443/U when GREEN indicator DS7902 switches on.
(5) A normal indication, noted in (4) above, should be +20.7 volts dc.
(a) If the indication obtained is normal, proceed toe below.
(b) If the indication obtained is not normal, proceed to *d* below.

d. Schmitt Trigger Isolation.
(1) Remove the test signal from the teat probe.
(2) Measure the dc voltages listed in the chart below with an ME-26B/U to isolate the faulty part.

Circuit junction	Untriggered +dc voltage to ground (volts)
Q7802 emitter	0.01
Q7602 collector	15.2
Q7803 emitter	1.35
Q7803 collector	6.20
Q7804 base	2.15
P7801-E	L 5
Q7805 base	0.47
Q7805 emitter	0.225
P7801-D	15.2
P7801-F	15.7

(3) Apply +20.7 volts dc to the probe and measure the voltages listed in the chart below.

Circuit junction	Triggered +dc voltage to ground (volts)
Q7802 emitter	1.4
Q7802 collector	1.32
Q7803 emitter	0.64
Q7803 collector	0.72
Q7804 base	0.37
Q7601-E	15.2
Q7805 base	3.1
Q7605 emitter	2.32
P7801-D	2.9
P7801-F	15. 7

(4) Remove *the* test signal and set TS-1777/VRM-1 ON-OFF switch S7901 to OFF.
(5) Replace the faulty part.
(6) Repeat c above.

e. Voltage Supply Limits Sensing Circuit Test.

(1) Perform the alignment procedure for the voltage supply limits sensing circuit (para 43 *c).*

(2) If the circuit does not adjust properly. Prooceed to *f* below.

(9) If the circuit does adjust properly, trouble Isolation In assembly A7800 is complete.

f. Voltage Supply Limits Sensing Circuit Isolation.

(1) Adjust the 721A for an output voltage of +12 volts dc and apply it to the test probe.

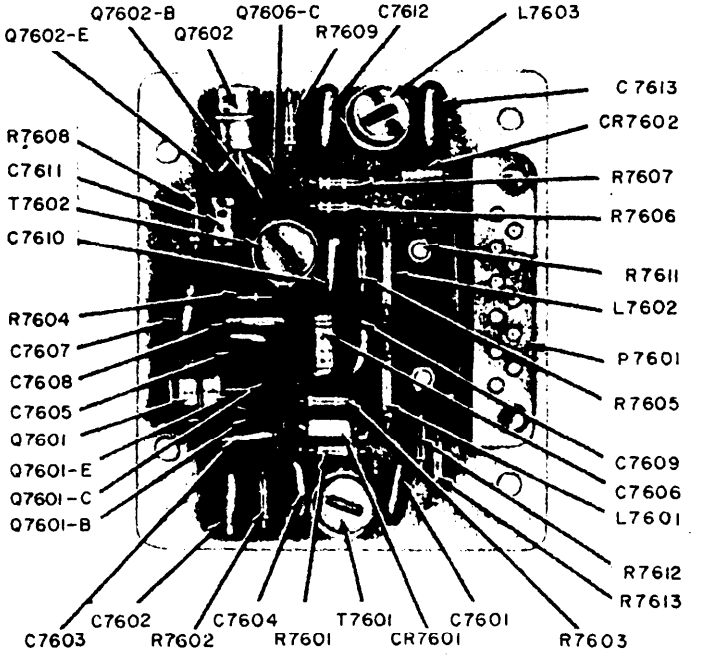
(2) *Measure the* dc voltage listed in the chart below with an ME-26B/U to isolate the faulty part.

Circuit junction	+dc voltage to ground (Volts)
P7801-K	15.7
P7801-L	12
Q7801 emitter	9.5
CR7801 and R7806	9.1
P7801-M	1.95

(3) *Remove* the test *signal* and set the TS-1777/VRM-1 ON-OFF switch S7901 to OFF.

(4) Replace the faulty part.

(5) Repeat e above



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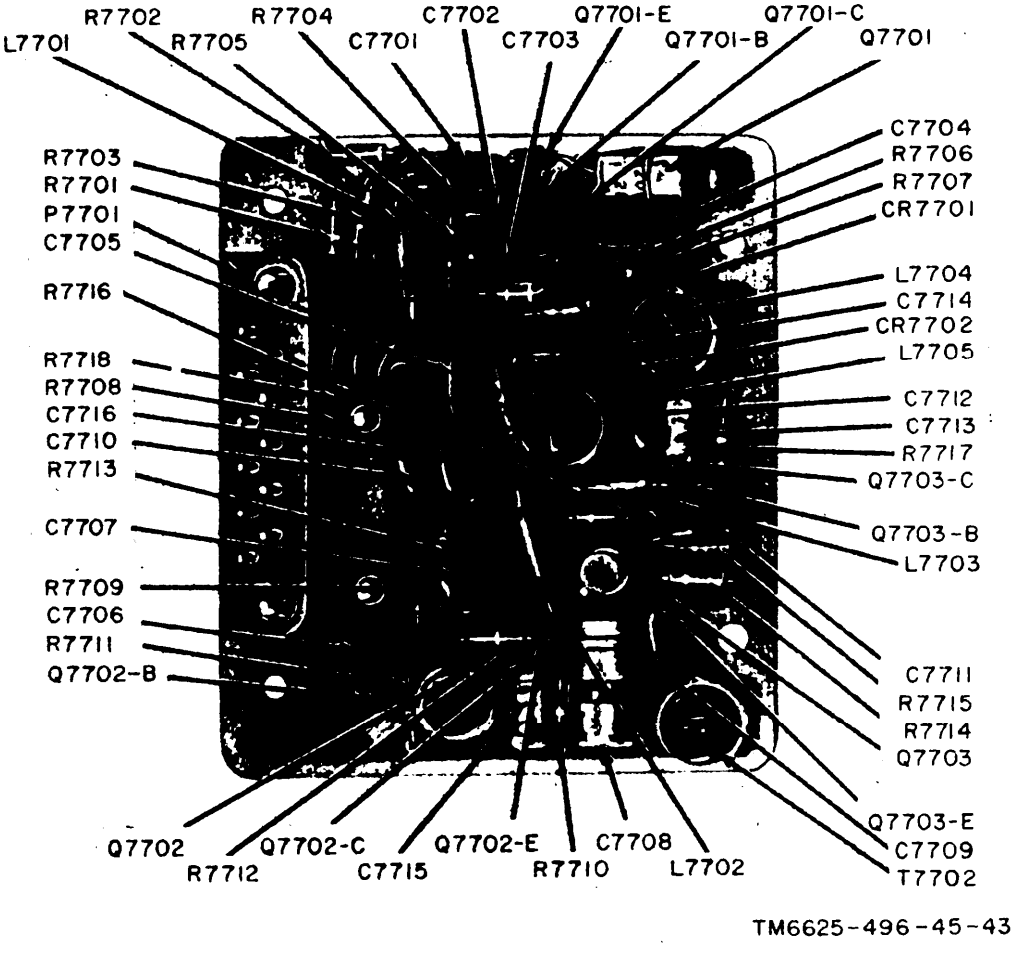


Figure 32.. Assembly A 7700, parts location.

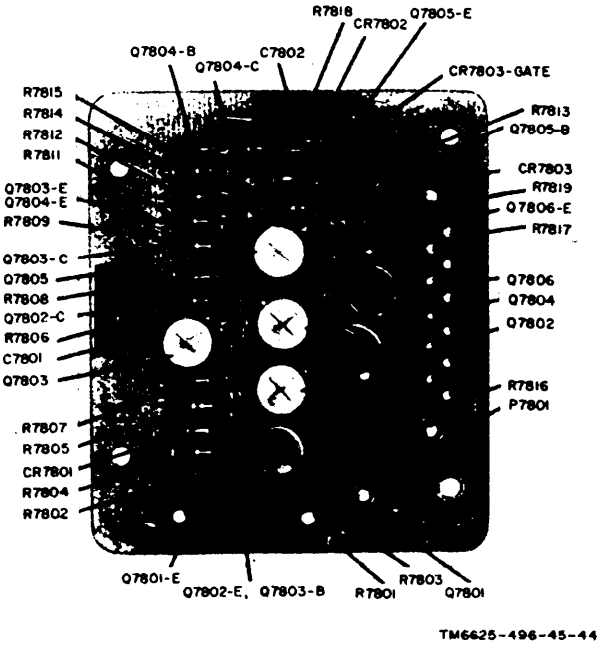


Figure 33. Assembly A 7800, parts Location.

Section II. FIFTH ECHELON TESTING PROCEDURES

60. Purpose of Final Testing

The tests outlined in this section measure the performance capability of a repaired TS-1777/VRM-l. Equipment that meets the minimum standards stated in the tests will furnish satisfactory operation equivalent to that of new equipment.

61. Test Equipment Required for Final Testing

The test equipment required for final testing is the same as that listed for fourth echelon testing (para 45). Refer to the appropriate technical manuals for instructions on the use of the test equipment.

62. Test Setup

Most of the tests will be performed under the conditions listed below and illustrated in figure 34. Testing will be simplified if the connections in *a* through c below are made initially and modifications are made as required for thle individual tests.

a. Connect the CX-4720/VRC between the PP-2309/U and connector J21 on the MT-1029/VRC.

b. Connect the three-terminal connector of the CX-7899/VRM-l to the three power (large size) terminals of connector J24 on the front of the MT-1029/VRC. Connect the four-terminal connector of the CX-7899/VRM-l to the POWER connector on the TS-1777/VRM-l.

c. Turn on the PP-2309/U and set the TS-1777/VRM-l ON-OFF Switch to ON. Adjust the PP-2309/U for an output of 26.0 volts dc.

63. Power Tests

Check the ability of the TS-1777/VRM-l to test power circuits as directed below.

a. Preparation.

(1) Insert the test probe tip in test jack A, turn the selector switch to A, and check to be sure that the GREEN indicator lights.

(2) Connect the output of the 721A to the test probe

b. Dc Test, +16- Volt.

(1) Turn the selector switch to A.

(2) Increase Transistor Power Supply 721A output voltage.

(a) The RED indicator should light before +7.0 volts is reached.

(b) The GREEN indicator should remain lighted between +14.2 and +17.6 volts.

(c) The RED indicator should light and remain lighted above +17.6 volts .

c. Dc Test, +26-Volt.

(1) Turn the selector switch to 2.

(2) Increase the 721A output voltage.

(a) The RED indicator should light before +10.0 volts is reached.

(b) The GREEN indicator should light and remain lighted above +20.7 volts.

d. Dc Test, +12-Volt.

(1) Turn the selector switch to 8.

(2) Increase the 721A output voltage.

(a) The RED indicator should light before +5.0 volts is reached.

(b) The GREEN indicator should remain lighted between +10.5 and +13.0 volts.

(c) The RED indicator should light and remain lighted above +13.0 volts .

64. Audio Tests (fig. 34)

Check the ability of the TS-1777/VRM-1 to test audio circuits as directed below.

a. *Preparation.*

(1) Insert the test probe tip in test jack A, turn the selector switch to A, and check to be sure that the GREEN indicator lights.

(2) Adjust the TS-382 F/U output frequency to 1,000 cps and connect it to the test probe.

(3) Connect the ME-30B/U across the TS-382F/U output.

b. Position 3 Test.

(1) Turn the selector switch to 3.

(2) Adjust the TS-382 F/U for an output of 1.4 volts ac as indicated by the ME-30B/U. The RED indicator should be lighted.

(3) Increase the audio output to 2.85 volts. The GREEN light should be lighted.

c. *Position 4 Test.*

(1) Turn the selector switch to 4.

(2) Adjust the TS-382F/U for an output of 7.0 volts ac as indicated by the ME-30B/U. The RED indicator should be lighted.

(3) Increase the output of the TS-382 F/U to 13.3 volts. The GREEN indicator should be lighted.

d. Position 5 Test.

(1) Turn the selector switch to 5.

(2) Adjust the TS-382 F/U for an output of 0.25 volt ac as indicated by the ME-30B/U. The RED indicator should be lighted.

(3) Increase the audio output of the TS-382 F/U to 0.49 volt. The GREEN indicator should be lighted.

e. *Position 6 Test.*

(1) Turn the selector switch to 6.

(2) Adjust the TS-382F/U for an output of 0.45 volt ac as indicated by the ME-30B/U. The RED indicator should be lighted.

(3) Increase the audio output of the TS-382 F/U to 0.90 volt. The GREEN indicator should be lighted.

f. Position 10 Test.

(1) Turn the selector switch to 10.

(2) Adjust the TS-382F/U for an output of 0.11 volt ac as indicated by the ME-30E/U. The RED indicator should be lighted.

(3) Increase the audio output of the TS-382 F/U to 0.225 volt. The GREEN indication should be lighted.

g. Position 11 Test.

(1) Turn the selector switch to 11.

(2) Adjust the TS-382F/U for an output of 3.2 volts ac as indicated by the

ME-30B/U. The RED indicator should be lighted.

(3) Increase the audio output of the TS-382 F/U to 6.4 volts. The GREEN indicator should be lighted.

65. Amplifier Tests, 5.65-Mc
(fig. 34)

Check the ability of the TS-1777/VRM-l to test 5.65-mc amplifier circuits as directed below.

a. Preparation.

(1) Insert the test probe tip in test jack A, turn the selector switch to A, and check to be sure that the GREEN indicator lights.

(2) Connect the output of Hf Signal Generator 606A adjusted to 5.65 mc to the test probe.

(3) Connect Rf Millivoltmeter 411A across the 606A output.

b. Position 12 Test.

(1) Turn the selector switch to 12.

(2) Adjust the 606A for an output of 0.09 volt ac as indicated by the 411A. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.18 volt. The GREEN indicator should be lighted.

c. *Position 15 Test.*

(1) Turn the selector switch to 15.

(2) Adjust the 606A for an output of 0.11 volt ac as indicated by the 411A. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.22 volt. The GREEN indicator should be lighted.

d. Position 16 Test.

(1) Turn the selector switch to 16.

(2) Adjust the 606A for an output of 0.24 v 01 t ac as indicated by the 411A. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.48 volt. The GREEN indicator should be lighted.

e. Position 17 Test.

(1) Turn the selector switch to 17.

(2) Adjust the 606A for an output of 0.36 volt ac as indicated by the 411A. The RED indicator should be lighted

(3) Increase the rf output of the 606A to 0.72 volt. The GREEN indicator should be lighted.

66. Amplifier Tests, 11.5-Mc
(fig. 34)

Check the ability of the TS-1777/VRM-l to test the 1.5-mc amplifier circuits as directed below.

a. Preparation.

(1) Insert the test probe tip in test jack A, turn the selector switch to A, and check to be sure that the *GREEN* indicator lights.

(2) Adjust Hf Signal Generator 6o6A output frequency to 11.5 mc and connect it to the test probe.

(3) Connect Rf Millivoltmeter 411A across the 606A output.

b. Position 7 Test.

(1) Turn the selector switch to 7.

(2) Adjust the 606A for an output of 0.13 volt ac as indicated on the 411A. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.27 volt. The GREEN indicator should be lighted.

c. Position 9 Test.

(1) Turn the selector switch to 9.

(2) Adjust the 606A for an output of 0.06 volt ac as indicated on the 411A. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.13 volt. The GREEN indicator should be lighted.

d. Position 13 Test.

(1) Turn the selector switch to 13.

(2) Adjust the 606A for an output of 0.11 volt ac as indicated by the 411A. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.225 volt. The GREEN indicator should be lighted.

e. Position 14 Test.

(1) Turn the selector switch to 14.

(2) Adjust the 606A for an output of 0.007-volt ac as indicated by the

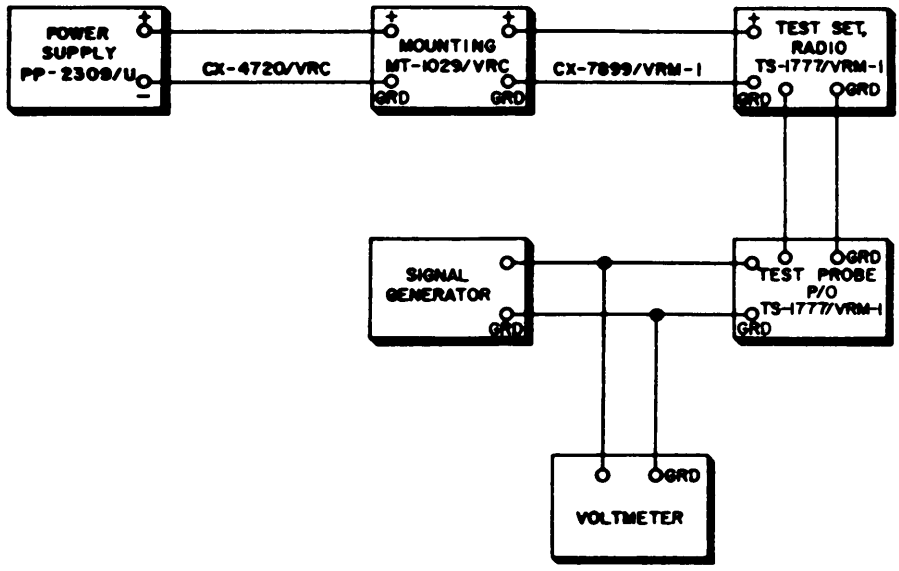


Figure 34. Test Set, Radio AN/VRM-1, final tests, block diagram.

411A. The RED indicator should be lighted.

Increase the rf output of the 606A to 0.014 volt. The GREEN indicator should be lighted

67. Amplifier Test, 47.0-Mc

(fig. 34)

check the ability of the TS-1777/VRM-l to test the 47.0-mc amplifier circuit as directed below.

a. Preparation.

(1) Insert the test probe tip in test jack A, turn the selector switch to A, and check to be sure that the GREEN indicator lights.

(2) Adjust Hf Signal Generator 606A output frequency to 47.0 mc and connect it to the test probe.

(3) Connect Rf Millivoltmeter 411A across the 606A output.

b. Position 18 Test.

(1) Turn the selector switch to 18.

(2) Adjust the 606A for an output of 0.10 volt ac as indicated on the 41lA. The RED indicator should be lighted.

(3) Increase the rf output of the 606A to 0.21 volt. The GREEN indicator should be lighted.

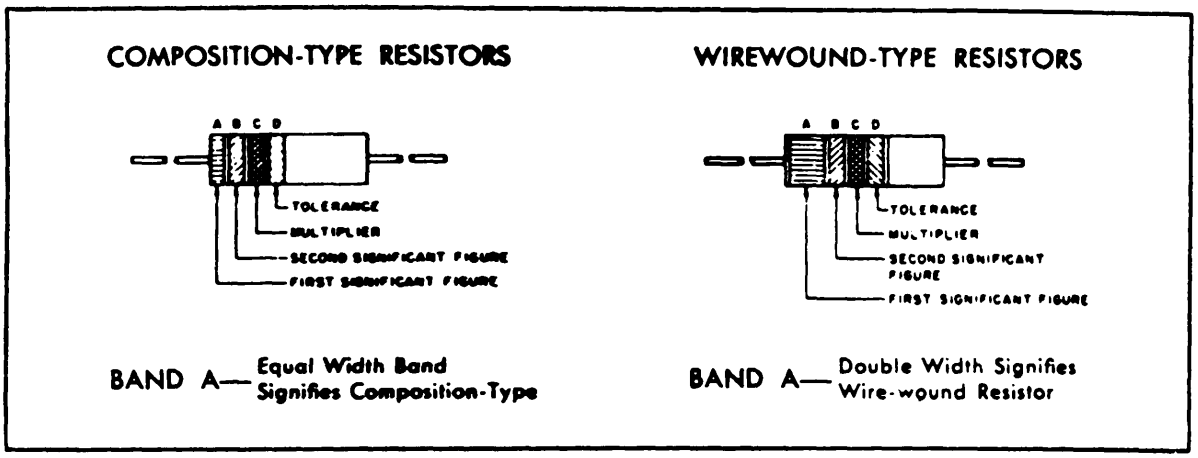
APPENDIX

REFERENCES

The following is a list of applicable references available to the field and depot maintenance repairmen of Test Set Radio AN/VRM-l.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TA 11-17	Signal Field Maintenance Shops.
TA 11-100(11-17)	Allowances of Signal Corps Expendable Supplies for Signal Field Maintenance Shops.
TM 11-2684	Audio Oscillators TS-312/FSM-1, TS-312A/FSM-1, and TS-382/U, and Signal Generator TS-312B/FSM-l.
TM 11-5057	Frequency Meter AN/USM-26.
TM 11-5820401-10	Operator's Manual: Radio Sets AN/VRC-12, and AN/VRC-43, 44, -45, 46, -47, 48, and 49.
TM 11-5820401-20	Organizational Maintenance Manual Radio Sets AN/VRC-12 and AN/VRC-43, 44, 45, 46, -47, -48, and 49.
TM 11-6625-200-12	Operator and Organizational Maintenance Manual: Multimeters ME-26A/U and ME-26B/U.
TM 11-6625-261-12	Operators and organizational Maintenance Manual: Audio Oscillators TS-382A/U, TS-382B/U, TS-382D/U, TS-382E/U, and TS-382F/U.
TM 11-6625-320-12	Operator's and Organizational Maintenance Manual: Voltmeter, Meter ME-30A/U and Voltmeters, Electronic ME-30B/U and ME-30C/U.
TM 11-6625414-10	Operator's Manual: Voltmeter TS-443/U.
TM 11-6625496-12	Operator and Organizational Maintenance Manual Test Set, Radio AN/VRM-1.
TM 11-6625-496-20P	Organizational Maintenance Repair Parts and Special Tools List for Test Set, Radio AN/VRM-l.
TM 11-6625-496-45P	Field and Depot Maintenance Repair Parts and Special Tools List for Test Set, Radio AN/VRM-l.

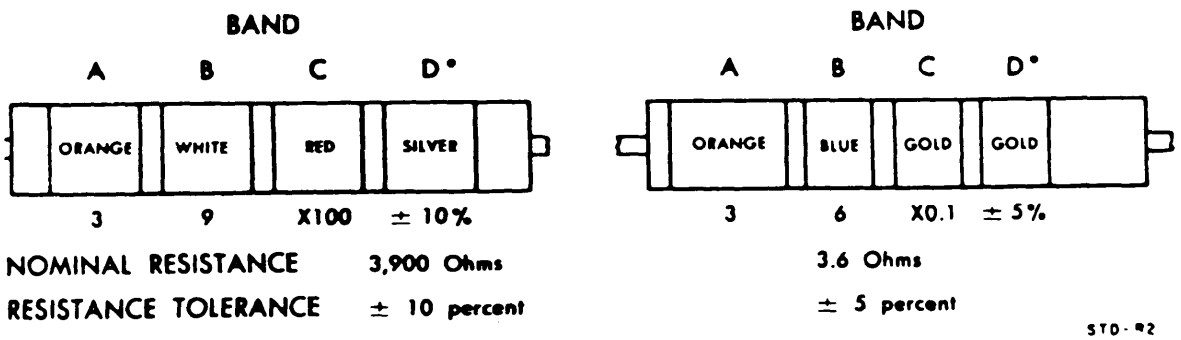
COLOR CODE MARKING FOR MILTARY STANDARD RESISTORS



COLOR CODE TABLE

BAND A		BAND B		BAND C		BAND D*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1		
BROWN	1	BROWN	1	BROWN	10		
RED	2	RED	2	RED	100		
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	± 10
GREEN	5	GREEN	5	GREEN	100,000	GOLD	± 5
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	SILVER	0.01		
WHITE	9	WHITE	9	GOLD	0.1		

EXAMPLES OF COLOR CODING

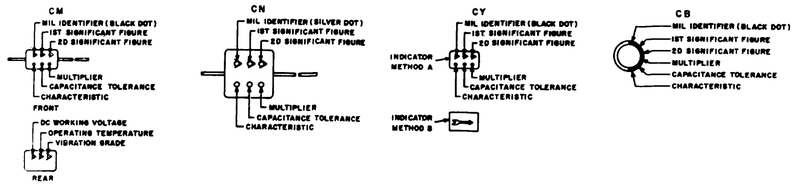


*If Band D is omitted, the resistor tolerance is ± 20%, and the resistor is not Mil-Std.

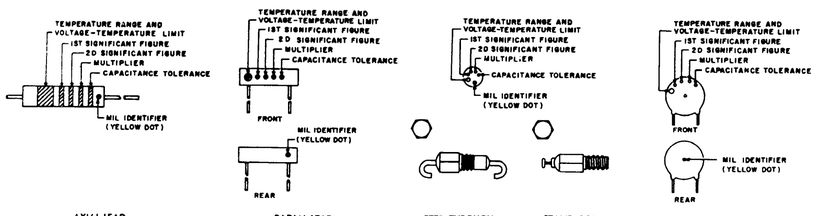
Figure 35. Color code markings for MIL-STD resistors

COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

GROUP I Capacitors, Fixed, Various-Dielectrics, Styles CM, CN, CY, and CB



GROUP II Capacitors, Fixed Ceramic-Dielectric (General Purpose) Style CK



GROUP III Capacitors, Fixed, Ceramic-Dielectric (Temperature Compensating) Style CC

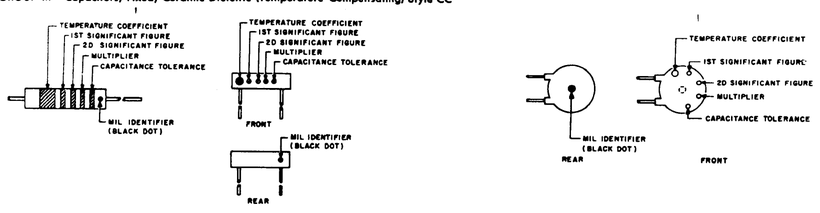


Figure 36. Color code markings for MIL-STD capacitors.

COLOR CODE TABLES

TABLE I – For use with Group I, Styles CM, CN, CY and CB

COLOR	MIL ID	1st SIG FIG	2nd SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE				CHARACTERISTIC[2]				DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CY	CB	CM	CM	CM
BLACK	CM, CY CB	0	0	1			± 20%	± 20%		A				−55° to +70°C	10–55 cps
BROWN		1	1	10					B	E		E			
RED		2	2	100	± 2%		± 2%	± 2%	C		C			−55° to +85°C	
ORANGE		3	3	1,000		± 30%			D			D	300		
YELLOW		4	4	10,000					E					−55° to +125°C	10–2,000 cps
GREEN		5	5		± 5%				F				500		
BLUE		6	6											−55° to +150°C	
PURPLE (VIOLET)		7	7												
GREY		8	8												
WHITE		9	9												
GOLD				0.1			± 5%	± 5%							
SILVER	CN				± 10%	± 10%	± 10%	± 10%							

TABLE II – For use with Group II, Generol Purpose, Style CK

COLOR	TEMP. RANGE AND VOLTAGE – TEMP. LIMITS[3]	1st SIG FIG	2nd SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE	MIL ID
BLACK		0	0	1	± 20%	
BROWN	AW	1	1	10	± 10%	
RED	AX	2	2	100		
ORANGE	BX	3	3	1,000		
YELLOW	AV	4	4	10,000		CK
GREEN	CZ	5	5			
BLUE	BV	6	6			
PURPLE (VIOLET)		7	7			
GREY		8	8			
WHITE		9	9			
GOLD						
SILVER						

TABLE III – For use with Group III, Temperature Compensating, Style CC

COLOR	TEMPERATURE COEFFICIENT[4]	1st SIG FIG	2nd SIG FIG	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					Capacitances over 10uuf	Capacitances 10uuf or less	
BLACK	0	0	0	1		± 2.0uuf	CC
BROWN	−30	1	1	10	± 1%		
RED	−80	2	2	100	± 2%	± 0.25uuf	
ORANGE	−150	3	3	1,000			
YELLOW	−220	4	4				
GREEN	−330	5	5		± 5%	± 0.5uuf	
BLUE	−470	6	6				
PURPLE (VIOLET)	−750	7	7				
GREY		8	8	0.01			
WHITE		9	9	0.1	± 10%		
GOLD	+100					± 1.0uuf	
SILVER							

1. The multiplier is the number by which the two significast (SIG) figures are multiplied to obtain the capacitance in uuf.
2. Letters indicate the Characteristics designated in applicable specifications: MIL–C–5, MIL–C–91, MIL–C–11272, and MIL–C–10950 respectively.
3. Letters indicate the temperature range and voltage-temperature limits designated in MIL–C–11015.
4. Temperature coefficient in parts per million per degree centigrade.

STD–CE

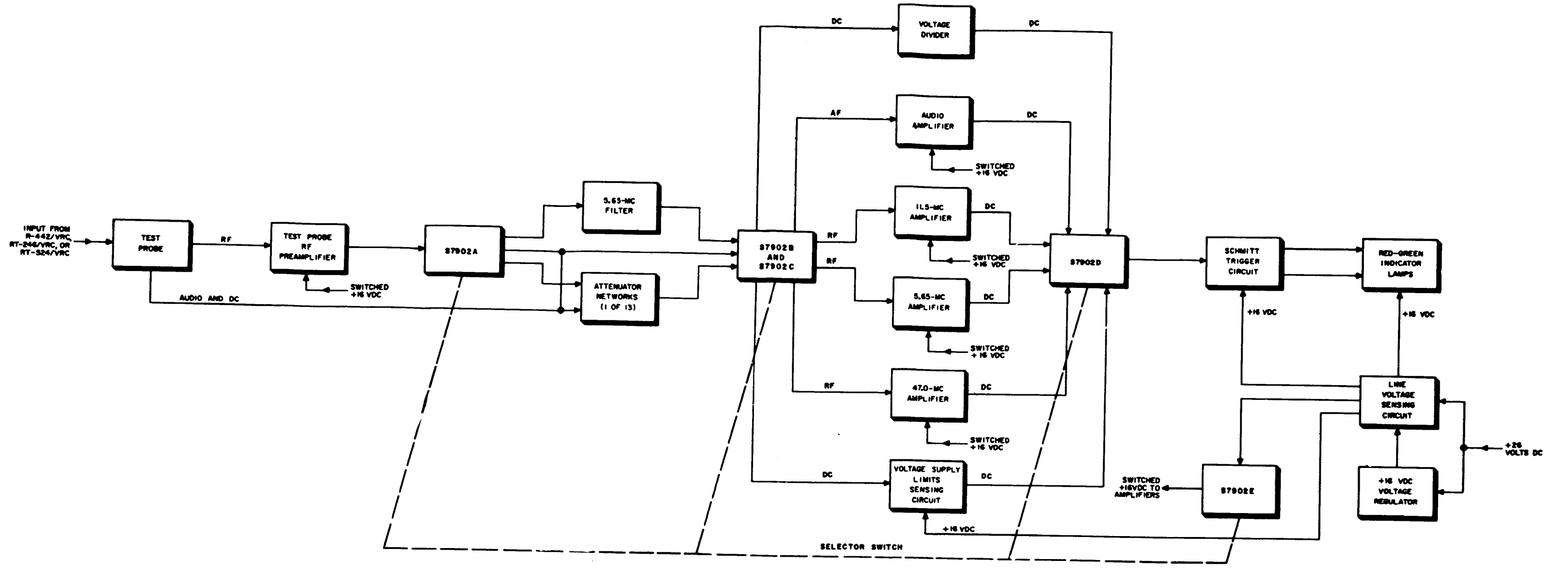
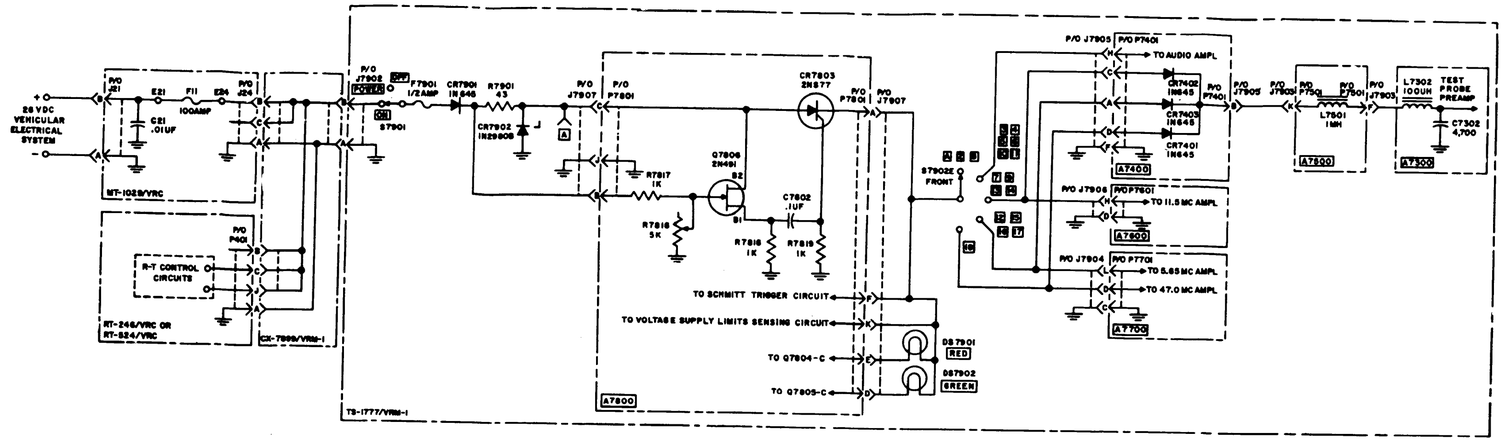


Figure 37. Test Set, Radio AN/VRM-1, block diagram.

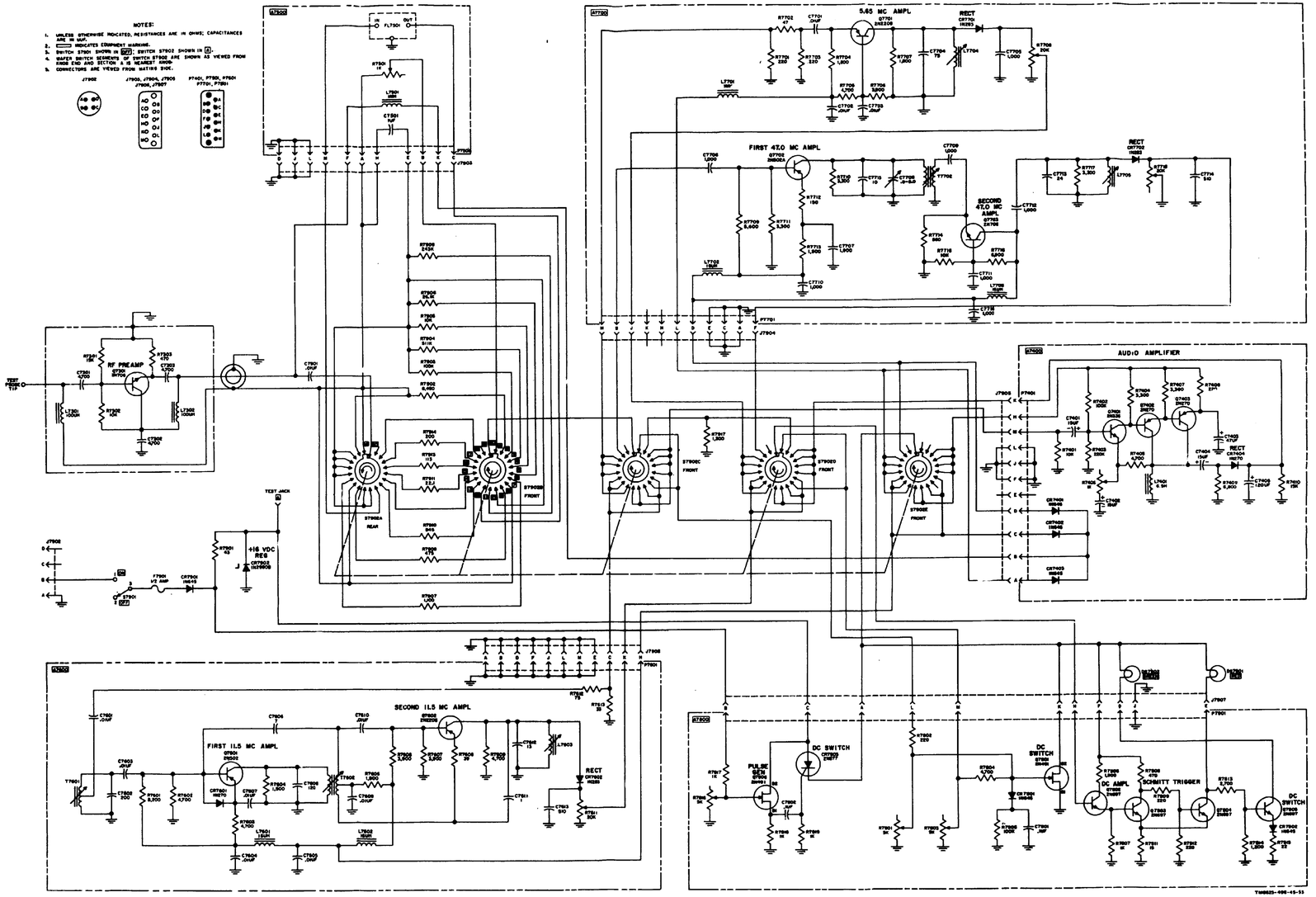


NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS; CAPACITANCES ARE IN UUF.
2. ▭ INDICATES EQUIPMENT MARKING.
3. SWITCH S7901 SHOWN IN OR ; S7902 SHOWN IN A .

TM9625-496-45-32

Figure 38. Test Set, Radio AN/VRM-1, power distribution diagram.


NOTES:
1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS; CAPACITANCES ARE IN MFD.
2. ═══ INDICATES EQUIPMENT MARKING.
3. SWITCH S7901 SHOWN IN OFF; SWITCH S7902 SHOWN IN A.
4. WAFER SWITCH SEGMENTS OF SWITCH S7902 ARE SHOWN AS VIEWED FROM RADIO END AND SECTION A IS NEAREST RADIO.
5. CONNECTORS ARE VIEWED FROM MATING SIDE.
J7902
J7903, J7904, J7905, J7906, J7907
P7401, P7501, P7601, P7701, P7801
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16
B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 A14 D15 D16
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15 E16
A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A

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